

dom succeed, or if the plants come up, it is rarely before the following spring. When the plants come up, they must be kept clean from weeds, and the autumn following they may be transplanted where they are to remain; they love a moist soil and a shady situation, but will not thrive under the drip of trees. The roots of the three first sorts will continue several years, and every year produce flowers and seeds. The fourth sort will rarely ripen seeds in a garden, so that I have been obliged to procure them from the place where it grows naturally.

PHAC A. Lin. Gen. Plant. 798. Astragaloides. Tourn. Inst. R. H. 399. tab. 223. Bastard Milk-vetch, or Astragaloides.

The CHARACTERS are,

The flower hath a tubulous empalement of one leaf, which is cut into five small indentures at the brim. It is of the butterfly kind, having a large, oval, erect standard, with two oblong wings shorter than the standard, which are obtuse, and a short compressed obtuse keel. It hath ten stamens, nine of which are joined in one body, and the other stands separate, terminated by roundish rising summits. In the center is situated an oblong germen, supporting an awl-shaped style, crowned by a single stigma. The germen afterward becomes an oblong swelling pod, whose upper future is depressed toward the under, having one cell, containing several kidney-shaped seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which includes those plants whose flowers have ten stamens joined in two bodies.

The SPECIES are,

1. PHACA (*Batica*) caulescens erecta pilosa, leguminibus tereti-cymbriformibus. Lin. Sp. Plant. 755. *Phaca with a hairy upright stalk, and taper boat-shaped pods.* Astragaloides Lusitanica. Tourn. Inst. R. H. 399. *Portugal Bastard Milk-vetch.*
2. PHACA (*Alpina*) caulescens erecta glabra, leguminibus oblongis inflatis subpilosis. Lin. Sp. Plant. 1064. *Phaca with an upright smooth stalk, and oblong, swelling, hairy pods.* Astragaloides elatior erecta, viciæ foliis, floribus luteis, siliquis pendulis. Amman. Ruth. 148. *Taller upright Milk-vetch, with a Vetch leaf, yellow flowers, and pendulous pods.*

The roots of the first sort which grows naturally in Spain and Portugal, will abide many years, and run very deep into the ground, but the branches decay every autumn; these commonly rise near four feet high, and become ligneous. The flowers are produced in short spikes from the wings of the leaves, but unless the season proves very warm, they rarely flower in England, for which reason the plants are not much esteemed; for it is not once in seven years that the flowers arrive to perfection, nor do the plants ever produce seeds in England; so that the seeds must be procured from abroad, by those who are desirous to have the plants.

The second sort hath smooth stalks, which do not rise so high as the former; the flowers are smaller, the pods are much shorter, and hang downward.

Both these sorts are propagated by seeds; those of the first should be sown in the place where the plants are to remain; for as the roots strike very deep into the earth, so it is very difficult to transplant them with any safety, especially after they have remained any considerable time in the seed-bed. The plants should be left about six feet asunder, that there may be room to dig the ground between them every spring, which is all the culture they require, except the keeping them clean from weeds.

The second sort produces flowers in two years from seeds, and the seeds ripen well in England, but the roots rarely live longer than three or four years.

PHALANGIUM. See ANTHERICUM.

PHALARIS. Lin. Gen. Plant. 74. Canary Grass.

The CHARACTERS are,

It is one of the Grass tribe, with one flower inclosed in a calyx, having two valves, which is boat-shaped and compressed; the flower is less than the cup, the outer valve is oblong and twisted, the inner is smaller. It has

three hair-like stamens, terminated by oblong summits; and a roundish germen supporting two hair-like styles, crowned by hairy stigmas; the seeds are inclosed by the petals of the flower, each containing one smooth seed pointed at each end.

This genus of plants is ranged in the second section of Linnæus's third class, intitled Triandria Digynia, the flowers having three stamens and two styles.

The SPECIES are,

1. PHALARIS (*Canariensis*) panicula subovata spiciformi, carinatis glumis. Lin. Sp. Plant. 79. *Canary Grass with oval spike-shaped panicles, and boat-shaped chaff.* Phalaris major semine albo. C. B. P. 28. *Canary Grass with a white seed.*
2. PHALARIS (*Arundinacea*) panicula oblonga ventricosa. Lin. Sp. Plant. 80. *Reed-like Canary Grass, with an oblong bellied panicle.* Gramen arundinaceum, acerosa gluma, Jerseianum. D. Sher.

There are several species of this genus which are never cultivated for use, therefore it would be to little purpose to enumerate them here.

The first sort is cultivated in some parts of England, particularly in the isle of Thanet in Kent, where this is esteemed as a profitable crop, and may be so to those who are situated where they have water carriage for the seed to the London markets, where is the general demand for this commodity. About London there is very little of it sown, and what is there cultivated is chiefly by some few curious persons, in small quantities, for their amusement. I have several years sown some of this seed by way of trial, but have never seen more than a few rods of ground sown with it, therefore cannot give so good an account of its culture as I could wish; however, I shall briefly give an account of the success I have had in those trials which I have made on this plant.

The first experiment I made was by sowing of the seed in broad cast all over the ground, and as the land was very poor, I sowed the seeds too thick, which is the common fault of farmers in general; the seeds grew well, but the months of May and June proving wet, the plants grew tall, and having weak tender stalks, a heavy rain which fell the beginning of August laid it flat on the ground, and many succeeding showers which happened after kept it down, so that the whole crop was lost.

The following year I sowed a spot of ground with this seed in rows at a foot distance, but the seeds were sown too thick in the drills, so that the plants were drawn up so weak, that great part of these were lodged by wet in the month of August; but many of the outside plants in the drills, whose stalks were much stronger than those of the other, remained upright, so produced a good quantity of seeds which ripened well. This put me on making a farther trial of this plant; accordingly I sowed the seeds thin, in drills made a foot asunder, and when the plants came up, where they were too close I thinned them, so as to leave them near two inches distance in the rows; and the season proving favourable, the plants sent out many stalks from the roots, which were strong, so able to bear up till the seed was perfectly ripened; and by hoeing the ground three times in the intervals, the weeds were destroyed, and the ground kept clean; the crop also was so plentiful, as to assure me that the culture of this plant would answer well to the farmer, provided a sufficient quantity of seed was demanded; but as there is but a moderate sale for the seeds, and that being chiefly in London, so the culture of this plant would not answer to those who are situated at a distance from the metropolis, or who had not water carriage for the seeds thither.

From several trials since made, I find that three gallons of the seed is sufficient to sow an acre of land; and if the seed is sown by a hopper, whose spring is properly set, to let out the seed at equal distance, it will be the best method of cultivating it; and keeping the ground clean from weeds, will not only improve the crop, but also be of great advantage to the future crops.

When the seed is ripe it should be immediately cut, otherwise a good quantity will soon shed out; and if it is turned two or three times to dry, according to the favourableness of the season, it will be fit to thrash out the seed, and the sooner that is done, the less loss there will be of the seed.

PHASEOLOIDES. See GLYCINE.

PHASEOLUS. Tourn. Inst. R. H. 412. tab. 232. Lin. Gen. Plant. 777. [takes its name of *φασόλη*, an oblong swift ship, because the husk of this plant resembles a ship.] Kidney-bean; in French, *Haricot*.

The CHARACTERS are,

The empalement of the flower is of one leaf, having two lips; the upper lip is indented at the top, and the under one is divided in three parts. The flower is of the butterfly kind; it hath a heart-shaped, obtuse, inclined standard, reflexed on the sides; the wings are oval, the length of the standard, and a narrow spiral keel twisted contrary to the sun. It hath ten stamina, nine joined in one body, and the other standing separate, which are spiral within the empalement, terminated by single summits, and an oblong, compressed, hairy germen, supporting a slender, inflexed, spiral style, crowned by an obtuse hairy stigma. The germen afterward becomes a long pod with a thick shell, ending in an obtuse point, inclosing oblong, compressed, kidney-shaped seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which contains those plants whose flowers have ten stamina joined in two bodies; he has divided the plants which were formerly included in this genus into two genera, one of which he calls *Dolichos*, and the other *Phaseolus*; the latter differs from the former, in having the parts of generation in the flowers spirally twisted.

It would be to little purpose to enumerate all the varieties of this plant which have come to our knowledge in this place, since America does annually furnish us with so many new sorts, as that there is no knowing what varieties there may be produced in different countries: besides, as they are not likely to be much cultivated here, since some of the old sorts are preferable to any of the new, for the use of the kitchen-garden, therefore I shall only first mention a few sorts which are cultivated for their flowers, or as curiosities, and then mention those which are most esteemed for the table.

The SPECIES are,

1. PHASEOLUS (*Alatus*) volubilis, floribus laxè spicatis, alis longitudine vexillo. Lin. Sp. Plant. 1017. *Kidney-bean with a twining stalk, and flowers growing in loose spikes, whose wings are as long as the standard.* Phaseolus flore purpureo, alis amplis longè protensis. Hort. Elth. 314. tab. 235. *Kidney-bean with a purple flower, having large wings which are stretched out to a great length.*
2. PHASEOLUS (*Caracalla*) volubilis, vexillis carinâque spiraliter convolutis. Lin. Sp. Plant. 1017. *Kidney-bean with a twining stalk, whose standard and keel are spirally twisted.* Phaseolus Indicus cochleato flore. Triumph. Obs. 93. *Indian Kidney-bean with a snail-shaped flower, commonly called Caracalla in Portugal.*
3. PHASEOLUS (*Vexillatus*) volubilis, vexillis revolutis patulis leguminibus linearibus strictis. Lin. Sp. Plant. 1017. *Kidney-bean with a twining stalk, a spreading standard which is twisted backward, and narrow close pods.* Phaseolus flore odorato, vexillo amplo patulo. Hort. Elth. 313. *Kidney-bean with a sweet flower, having a large spreading standard.*
4. PHASEOLUS (*Farinosus*) volubilis pedunculis subcapitatis, feminibus tetragono-cylindricis pulverulentis. Hort. Upsal. 214. *Kidney-bean with a twining stalk, foot-stalks ending in flowers growing in heads, and four-cornered cylindrical dust-coloured seeds.* Phaseolus peregrinus, flore roseo, semine tomentoso. Nissol. Act. Par. 1730. *Foreign Kidney-bean with a Rose-coloured flower and downy seeds.*
5. PHASEOLUS (*Vulgaris*) volubilis, floribus racemosis geminis, bracteis calycè minoribus, leguminibus pendulis. Lin. Sp. Plant. 724. *Kidney-bean with a twining*

stalk, branching flowers growing by pairs, bractees which are shorter than the empalement, and hanging pods. Phaseolus Indicus, flore coccineo five puniceo. Mor. Hist. 2. p. 69. *Indian Kidney-bean with a scarlet or purple flower, commonly called the Scarlet-bean.*

6. PHASEOLUS (*Coccineus*) volubilis, floribus racemosis, filiquis brevibus pubescentibus. *Kidney-bean with a twining stalk, flowers growing in long bunches, and short hairy pods.* Phaseolus florum spicâ pyramidata, semine coccineo nigra maculâ notatâ. Plum. Cat. 12. *Kidney-bean with flowers growing in a pyramidal spike, and scarlet seeds which are marked with black.*

The first sort is an annual plant; the seeds of this were brought from Carolina, where it grows naturally. The stalks of this twine about any support like the common Kidney-bean; they are hairy, and rise four or five feet high; the leaves are shaped like those of the common Kidney-bean, but are narrower. The flowers are produced in loose spikes, standing upon long foot-stalks; they are large and of a purple colour, turning to a blue before they fade. These appear in July, and if the autumn proves warm, they will be succeeded by narrow long pods, containing small oval seeds which ripen in October.

The seeds of this sort should be sown on a warm border about the latter end of April, and when the plants begin to run up, they must be supported either with sticks, or fastened to a hedge or wall, to prevent their trailing on the ground, and constantly kept clean from weeds. If they are close to a wall or hedge exposed to a good aspect, they will ripen their seeds in England, otherwise they frequently fail in bad seasons.

The second sort grows naturally in the Brazils, from whence the seeds were brought to Europe. This is a perennial plant with twining stalks, which rise to the height of twelve or fourteen feet; the leaves are shaped like those of the common Kidney-bean, but are smaller. The flowers are produced in slender spikes; they are of a purplish colour, and have an agreeable odour; these are succeeded by slender pods which are compressed, containing several oval compressed seeds. This is propagated by seeds, which should be sown in a moderate hot-bed in the spring; and when the plants come up, they must be carefully transplanted into pots filled with light fresh earth, and must be plunged into a hot-bed to facilitate their taking root; after which they should be inured to bear the open air by degrees, into which they should be removed the end of June or beginning of July, placing them in a sheltered situation; and as they advance in their growth, and fill the pots with their roots, they should be removed into larger pots, which must be filled with fresh light earth.

During the summer season they must be frequently refreshed with water; but in winter they must be removed into the green-house, and should have but little water during that season. These plants when young, are tender, but after the first winter they will require only to be screened from frost, but must have open free air whenever the weather will permit, otherwise the leaves will grow mouldy, and decay the tender shoots. This plant produces its flowers in July and August, but seldom perfects its seeds in England. It is very common in Portugal, where the inhabitants plant it to cover arbours and seats in gardens, for which it is greatly esteemed by the inhabitants of that country, for its beautiful sweet smelling flowers, and in that country it thrives very well in the open air.

The third sort grows naturally in America, and is preserved in some curious gardens for variety, but is a plant of no great beauty; this may be propagated by sowing the seeds in the spring upon a hot-bed, and when the plants come up, they must be planted in pots, and treated as the former sort. It produces its flowers in July, and the seeds ripen in September. The fourth sort was brought from America, and is preserved in curious gardens for the sake of its long flowering. This is an abiding plant, and should be managed as was directed for the third sort, but this requires

requires a stove to preserve it through the winter in England.

The fifth sort has been long cultivated in the English gardens for the beauty of its scarlet flowers; this hath twining stalks, which, if properly supported, will rise to the height of twelve or fourteen feet; the leaves are smaller than those of the common Kidney-bean. The flowers grow in large spikes, and are much larger than those of the common Kidney-bean, and of a deep scarlet colour; the pods are large and rough, and the seeds are purple marked with black. This sort requires no other treatment than the common sort, but the stalks should have tall stakes put down by them to twine round, otherwise they will fall on the ground, which will soon cause them to rot.

Although this sort is chiefly cultivated for the beauty of its flowers at present, yet I would recommend it as the best sort for the table; and whoever will make trial of this, I dare say must prefer it to all the other kinds yet known.

The fifth sort grows naturally in the warmest part of America, so will not thrive in England out of a stove; and as the chief beauty of it is in the seeds, which are half scarlet and the other half black, so these may be procured from abroad better than raised here.

I shall now mention those sorts of Kidney-beans which are cultivated in the English gardens to supply the table, which are few in comparison of the number already known, though these are not many of them valuable, and are only cultivated because they require less care, or will come a little forwarder in the season, for they are inferior in taste to the others; however, as there are some persons who esteem them for their qualities before-mentioned, so I shall put them down in the order of their ripening for use.

The three sorts which are usually cultivated for early crops, are the small white Dwarf, the Dwarf black, which is called the Negro-bean, and the Liver Colour Bean. The stalks of these are never very long, so may be planted much nearer together than the larger growing kinds, and they require but little support; so these are planted on hot-beds under frames, or in pots which are placed in stoves, to come early in the spring, for which purpose they are better adapted than any of the other; but they are not to be compared with some of the others for goodness; but as they may be had at a time when the others cannot be so well obtained, so they are generally cultivated in the gardens; and where there are not the convenience of stoves or frames for raising them very early, they are planted in warm borders near hedges, walls, or pales, where they will be fit for use a fortnight earlier than the other sorts.

The next to these are the Battersea and Canterbury Kidney-beans; these do not ramble far, and produce their flowers near the root, so bear plentifully for some time: the Battersea Bean is the forwarder of the two, but the other will continue bearing much longer; they are both better flavoured than either of the three former sorts, but when they begin to be large are very stringy and tough.

There are two or three sorts of Kidney-beans cultivated with erect stalks, which want no support, as they do not put out any twining stalks; these are much cultivated by the gardeners for that reason, as also for their producing a great plenty of pods; but they are inferior in goodness to all the other, especially that sort with black and white seeds, whose pods have a rank flavour, and, when boiled, become soft and mealy; so this should never be propagated by persons of taste.

The best sorts for the table are the scarlet Blossom-bean before-mentioned, and a white Bean of the same size and shape, which appears to be only a variety of the scarlet, as it differs in no other respect but the colour of the flowers and seeds, being equal in size and flavour. And next to these is the large Dutch Kidney-bean, which grows as tall as either of these, so must be supported by stakes, otherwise their stalks

will trail upon the ground and spoil. The sort with scarlet flowers is preferable to this in goodness, and is also hardier; and although it will not come so early as some of the dwarf kinds, yet as it will continue bearing till the frost puts a stop to it in the autumn, so it is much preferable to either of them; for the pods of this sort when old, are seldom stringy, and have a better flavour than the young pods of those sorts, and will boil greener; and where this is sown in the same situation and soil as the Battersea-bean, it will not be a fortnight later.

All the sorts of Kidney-beans are propagated by seeds, which are too tender to be sown in the open air before the middle of April; for if the weather should be cold and wet after they are in the ground, they will soon rot; or if the morning frosts should happen after the plants come up, they will be destroyed; therefore the best way to have early Kidney-beans, where there is no convenience of frames for raising them, is to sow the seeds in rows pretty close upon a moderate hot-bed, the latter end of March, or the beginning of April. If the heat of the bed is sufficient to bring up the plants, it will be enough; this bed should be arched over with hoops, that it may be covered with mats every night, or in bad weather. In this bed the plants may stand till they have put out their trifoliate leaves, then they should be carefully taken up, and transplanted in warm borders near hedges, pales or walls. If the season proves dry at the time of removing them, the plants should be gently watered to forward their taking new root, and afterward they must be managed in the same way as those which are sown in the full ground. These transplanted Beans will not grow so strong as those which are not removed, nor will they continue so long in bearing, but they will come at least a fortnight earlier than those which are sown in the full ground.

The first crop intended for the full ground, should be put in about the middle of April; but these should have a warm situation and a dry soil, otherwise the seeds will rot in the ground; or if the weather should prove so favourable as to bring up the plants, yet there will be danger of their being killed by morning frosts, which frequently happen the beginning of May.

The second crop, which should be one of the three large sorts last mentioned, should be sown about the middle of May. These will come into bearing before the early kinds are over, and if they are of the scarlet sort, will continue fruitful till the frost destroys the plants in the autumn, and these will be good as long as they last. The manner of planting them is to draw shallow furrows with a hoe, at about three feet and a half distance from each other, into which you should drop the seeds about two inches asunder; then with the head of a rake draw the earth over them, so as to cover them about an inch deep.

If the season is favourable, the plants will begin to appear in about a week's time after sowing, and soon after will raise their heads upright; therefore, when the stems are advanced above ground, you should gently draw a little earth up to them, observing to do it when the ground is dry, which will preserve them from being injured by sharp winds; but you should be careful not to draw any of the earth over their seed-leaves, which would rot them, or at least greatly retard their growth. After this, they will require no farther care but to stick them when the plants begin to run, and to keep them clear from weeds until they produce fruit, when they should be carefully gathered two or three times a week; for if they are permitted to remain upon the plants a little too long, the Beans will be too large for eating, and the plants would be greatly weakened thereby.

The large sorts of Kidney-bean must be planted at a greater distance, row from row; for as these grow very tall, so if the rows are not at a greater distance, the sun and air will be excluded from the middle rows, therefore these should not be less than four feet distance row from row; and when the plants are about four inches high, the stakes should be thrust into the ground

ground by the side of the plants, to which they will fasten themselves, and climb to the height of eight or ten feet, and bear plenty of fruit from the ground upward. The Dutch and French preserve great quantities of the large Dutch Beans for winter use, which they stew, and make good with gravy and other sauces.

There are some persons who raise these in hot-beds, in order to have them early. The only care to be taken in the management of these plants when thus raised, is to allow them room, and give them as much air as can be conveniently when the weather is mild, as also to let them have but a moderate heat; for if the bed is over hot, they will either burn or be drawn up so weak as seldom to come to good.

The manner of making the hot-bed being the same as for Cucumbers, &c. need not be repeated in this place; but only observe, when the dung is equally levelled, to lay the earth about four or five inches thick, and let the great steam of the bed pass off before you sow the seeds. The time for doing this must be proportioned to the season when you would have the Beans for the table, but the surest time for a crop is about a week in February.

The manner of saving the seeds of these plants, is to let a few rows of them remain ungathered in the height of the season; for if you gather from the plants for some time, and afterwards leave the remaining for seed, their pods will not be near so long and handsome, nor will the seed be so good. In autumn, when you find they are ripe, you should in a dry season pull up the plants, and spread them abroad to dry; after which you may thresh out the seed, and preserve it in a dry place for use.

PHELLANDRIUM, Water Hemlock.

There are two species of this genus at present known; one of which grows naturally in standing waters and deep ditches in several parts of England, the other is found on the Alps; but as neither are cultivated, so I shall not trouble the reader with any farther account of them.

PHILADELPHUS. Lin. Gen. Plant. 540. Syringa. Tourn. Inst. R. H. 617. tab. 389. Syringa, Pipe-tree, or Mock-orange.

The CHARACTERS are,

It hath a permanent empalement of one leaf, cut into five acute parts sitting upon the germen. It hath four or five roundish plain petals which spread open, and twenty or more awl-shaped stamina inserted to the empalement, terminated by erect summits with four furrows. The germen is situated under the flower, supporting a slender style divided in four parts, each being crowned by a single stigma. The germen afterward becomes an oval acute-pointed capsule having four cells, which are filled with small oblong seeds.

This genus of plants is ranged in the first section of Linnæus's twelfth class, which includes those plants whose flowers have about twenty stamina, which are fixed either to the petals or empalement of the flower.

The SPECIES are,

1. PHILADELPHUS (*Coronarius*) foliis subdentatis. Lin. Sp. 671. *Philadelphia* with indented leaves. *Syringa alba*, five *Philadelphus Athenæi*. C. B. P. *White Syringa*, or *Mock-orange*.
2. PHILADELPHUS (*Nanus*) foliis ovatis subdentatis, flore solitario pleno. *Syringa* or *Mock-orange*, with oval leaves which are somewhat indented, and double flowers standing singly on the sides of the branches. *Syringa nana* nunquam florens. Cat. Hort. Angl. *Dwarf Syringa* which seldom flowers.
3. PHILADELPHUS (*Inodorus*) foliis integerrimis. Lin. Sp. Plant. 672. *Philadelphus* with entire leaves. *Philadelphus* flore albo majore inodoro. Catesb. Carol. i. p. 84. tab. 84. *Syringa* with a larger white flower having no scent.

The first sort has been long cultivated in the English gardens as a flowering shrub, but the place where it naturally grows is uncertain. This sends up a great number of slender stalks from the root, having a gray bark, sending out several short branches from their

side, garnished with oval spear-shaped leaves; those upon the young shoots are three inches and a half long, and two broad in the middle, lessening toward both ends, and terminating in acute points, having several indentures on their edges, their surface rough, and of a deep green on their upper side, but pale on their under, and have the taste of fresh Cucumbers; these stand opposite upon very short foot-stalks. The flowers come out from the side, and at the end of the branches, in loose bunches, each standing on a short distinct foot-stalk; they have four oval petals which spread open, with a great number of stamina within, surrounding the style. The flowers are white, and have a strong scent, which at some distance resembles that of Orange-flowers, but when near is too powerful for most persons. These appear the latter end of May, and continue great part of June, but are seldom succeeded by seeds which ripen in this country. This shrub rises seven or eight feet high.

There is a variety of this with variegated leaves, which some people preserve in their gardens; but as the stripes generally disappear when the plants are in health, so it makes little appearance.

The second sort is of humble growth, seldom rising above three feet high; the leaves are shorter than those of the former, and approach near to an oval form; they are but little indented on their edges. The flowers come out singly from the side of the branches, and have a double or treble row of petals, of the same size and form as the other, and the flowers have the same scent; but this sort flowers very rarely, so is not much esteemed.

Both these are extreme hardy, and will thrive in almost any soil or situation, but will grow taller in light good ground than in that which is stiff. They are usually propagated by suckers, which are sent out from their roots in great plenty; these should be taken from the old plants in autumn, and planted in a nursery to grow one or two years till they have obtained strength, and then they should be transplanted to the place where they are designed to remain. They are commonly disposed in wilderness work, among other shrubs of the same growth, where they add to the variety.

The third sort grows naturally in Carolina, and is as yet very rare in Europe. This rises with a shrubby stalk about sixteen feet high, sending out slender branches from the sides opposite, garnished with smooth leaves shaped like those of the Pear-tree, which are entire, standing also opposite on pretty long foot-stalks. The flowers are produced at the end of the branches; they are large, each having four oval petals which spread open, and have large empalements, composed of four acute-pointed leaves. The petals are white, and within these stand a great number of short stamina, terminated by yellow summits. The flowers are succeeded by oval capsules, filled with small seeds.

This shrub is very rare in England, for it rarely will rise from seeds; I have sown the seeds, which were sent me by the late Dr. Dale from Carolina, two or three times without any success, and others have done the same, which occasions its present scarcity in England; but when the plants are procured from abroad, they may be propagated by laying down their branches. I had one of the shrubs which was sent me by the gentleman before-mentioned, which had thriven in the Chelsea Garden near two years; and some of the branches which were laid down had put out roots, but they were all destroyed by cold in the winter, 1740.

PHILLYREA. Tourn. Inst. R. H. 596. tab. 367. Lin. Gen. Plant. 16. Phillyrea, or Mock Privet; in French, *Filaria*.

The CHARACTERS are,

The flower has a small permanent empalement of one leaf, cut into five segments at the brim. It has one petal, with a very short tube cut into five parts, which turn backward, and two short stamina standing opposite, terminated by single erect summits. It has a roundish germen, supporting

supporting a slender style the length of the stamina, crowned by a thick stigma. The germen afterward turns to a globular berry with one cell, inclosing one large roundish seed.

This genus of plants is ranged in the first section of Linnæus's second class, which contains those plants whose flowers have two stamina and one style.

The SPECIES are,

1. PHILLYREA (*Latifolia*) foliis ovato-lanceolatis integerrimis. *Phillyrea* with oval, spear-shaped, entire leaves. *Phillyrea latifolia* Lævis. C. B. P. 476. Broad-leaved smooth *Phillyrea*, commonly called the true *Phillyrea*.
2. PHILLYREA (*Media*) foliis ovatis subintegerrimis. Lin. Sp. 10. *Phillyrea* with oval leaves, which are almost entire. *Phillyrea folio leviter serrato*. C. B. P. *Phillyrea* with a leaf lightly sawed, called broad-leaved *Phillyrea*.
3. PHILLYREA (*Spinosa*) foliis cordato-ovatis ferratis. Hort. Cliff. 4. *Phillyrea* with oval heart-shaped leaves, which are sawed. *Phillyrea latifolia spinosa*. C. B. P. 476. Broad-leaved prickly *Phillyrea*.
4. PHILLYREA (*Ligustrifolia*) foliis lanceolatis integerrimis. Hort. Cliff. 4. *Phillyrea* with spear-shaped entire leaves. *Phillyrea folio ligustri*. C. B. P. 476. Privet-leaved *Phillyrea*.
5. PHILLYREA (*Oleæfolia*) foliis lanceolato-ovatis integerrimis, floribus confertis axillaribus. *Phillyrea* with spear-shaped, oval, entire leaves, and flowers growing in clusters from the sides of the branches. *Phillyrea olæ Ephesiæ folio*. Pluk. Alm. 295. Phyt. tab. 310. fig. 3. Olive-leaved *Phillyrea*.
6. PHILLYREA (*Angustifolia*) foliis lineari-lanceolatis integerrimis, floribus confertis axillaribus. *Phillyrea* with narrow, spear-shaped, entire leaves, and flowers growing in clusters from the sides of the branches. *Phillyrea angustifolia prima*. C. B. P. 476. First narrow-leaved *Phillyrea*.
7. PHILLYREA (*Rosmarinifolia*) foliis linearibus integerrimis. *Phillyrea* with very narrow entire leaves. *Phillyrea angustifolia secunda*. C. B. P. 476. Second narrow-leaved *Phillyrea*, commonly called Rosemary-leaved *Phillyrea*.

The first sort here mentioned is the most common in the English gardens, where it is known by the title of true *Phillyrea*; so called, to distinguish it from the *Alaternus*, which is called simply *Phillyrea* by the gardeners. This rises with a strong upright stem to the height of eighteen or twenty feet, dividing into several branches, covered with a smooth grayish bark, and garnished with oval spear-shaped leaves placed opposite, which are entire, firm, and of a light green, about an inch and a half long, and an inch broad, standing upon short foot-stalks. The flowers come out from the wings of the stalk on each side; they are of an herbaceous white colour, and grow in small clusters. These appear in March, but as they are small make no great appearance; they are succeeded by globular berries with one cell, inclosing a single seed of the same form.

The second sort rises to an equal height with the first, but the branches are more diffused, and have a darker bark; the leaves are oval, and of a darker green; they are more than two inches long, and almost an inch and a half broad, a little sawed on their edges, placed opposite, and have short foot-stalks. The flowers come out from the wings of the branches, growing in long bunches; they are of an herbaceous white colour, appear about the same time as the former, and are succeeded by berries of the same form. The third sort rises with an upright stem as high as the two former, sending out several strong branches which grow erect, covered with a gray bark, and garnished with oval heart-shaped leaves, about an inch and a half long, and one inch broad; they are firm, of a lucid green, and sawed on their edges, each ferrature ending in a spine. The flowers and seeds of this are like those of the two former sorts.

The fourth sort is of humbler growth than either of the former, seldom rising more than eight or ten feet high; the branches are weaker, and spread wider,

and are covered with a light brown bark, and garnished with stiff spear-shaped leaves almost two inches long, and half an inch broad in the middle, drawing to a point at both ends; they are of a light green, and sit close to the branches opposite. The flowers are produced in small clusters at the wings of the branches; they are small, and whiter than those of the former, appearing about the same time, and are succeeded by small berries which ripen in autumn.

The fifth sort rises about the same height as the fourth; the branches are stronger, and spread out wider; the bark is of a lighter colour; the leaves are stiff, smooth, and entire, standing opposite on very short foot-stalks; they are of a lucid green, and terminate in a point. The flowers come out in clusters upon pretty long foot-stalks, at the wings of the young branches; they are small, white, and appear at the same time with the other sorts, and have round berries succeeding them, which ripen in autumn.

The sixth sort rises with a woody stalk ten or twelve feet high, sending out branches opposite, which are covered with a brown bark spotted with white, garnished with smooth, stiff, narrow, spear-shaped leaves, which are entire, sitting close to the branches; they are about an inch and a half long, and half an inch broad in the middle, drawing to a point at both ends, of a light green, and point upward. The flowers come out in large clusters at each joint of the branches, to which they sit close like the whorled flowers, almost surrounding the stalk; these are small, white, and appear at the same time as the former, and are succeeded by small berries, which ripen in autumn.

The seventh sort is of humbler growth than either of the former, seldom rising more than four or five feet high, sending out slender branches opposite, which are sparsely disposed; the leaves are of a dark green, stiff, and entire; they are about an inch long, and not more than one eighth of an inch broad, sitting close to the branches. The flowers are small, white, and grow in clusters from the side of the branches. The berries of this sort are very small, and rarely ripen in England.

These plants all grow naturally in the south of France, Spain, and Italy, but are hardy enough to thrive in the open air in England, and are never injured except the winters are very severe, which sometimes causes their leaves to fall, and kills a few of the weaker branches, but these are repaired by new shoots the following summer; so that there are but few of the evergreen-trees which are hardier than these, or that deserve more to be cultivated for pleasure.

Formerly these were either planted against walls, to which they were trained to cover them; or if they were placed as standards, their branches were sheared either into balls or pyramids, like most of the evergreen-trees; so that when the former old taste of laying out gardens was exploded, the evergreens were generally banished; and for some years there were but few sorts cultivated, whereby several valuable kinds of evergreen-trees were almost entirely lost in England, and have been with difficulty retrieved since; for in the manner which the evergreen-trees and shrubs are now disposed in gardens, they have a very fine effect, especially during the winter season, when the other trees are destitute of leaves.

There are some other sorts mentioned to grow naturally in Spain and Italy, but those here mentioned are all that I have seen growing in the English gardens; and several of these have been supposed only accidental varieties, which have been produced from seeds; but I am more inclined to believe they are specifically different, for I have raised most of these from seeds which were sent me from Italy, where the sorts were carefully gathered distinct, and have never yet found them vary from the kinds the seeds were taken; so that I imagine those seeds from which two or three kinds have been raised, were gathered from different plants without care.

The three first sorts are very proper to intermix with other evergreen-trees of the same growth, to form

clumps in parks, or to plant round the borders of woods, which are filled with deciduous trees, where in the summer time, the dark shade of these evergreens will make a fine contrast with the brighter green leaves of the deciduous trees; and in winter, when the latter are destitute of leaves, they will have a fine effect, and will be a fine harbour for birds. These may be trained up to stems, so as to be out of the reach of cattle, therefore may be planted in open places, where, if they are fenced against cattle till they are grown up, they may be afterwards exposed.

The other sorts, which are of humbler growth, must be confined to gardens or other inclosures, where they may be secured from cattle, hares, rabbits, &c. otherwise they will be soon destroyed.

These plants are propagated either from seeds or layers, but the latter being the most expeditious method in England, is chiefly preferred. The best time to lay them down is in autumn, when you should dig the ground round the stems of the plants intended to be layed, making it very loose; then making choice of a smooth part of the shoot, you should make a slit upward (in the manner as is practised in laying of Carnations) and then bend the branch gently down to the ground, making a hollow place with your hand to receive it; and having placed the part which was slit into the ground, so as that the slit may be open, you should fasten it down with a forked stick that it may remain steady, covering that part of the branch with earth about three inches thick, observing to keep the upper part erect. You must keep them clear from weeds the spring and summer following, which, if suffered to grow up amongst them, will prevent their taking root.

The autumn following most of these plants will be rooted, at which time they may be taken off, and carefully planted in a nursery, where they may be trained up three or four years in the manner you intend them to grow; during which time you should dig the ground between the rows, and cut about the roots of the plants every year, which will cause them to strike out strong fibres, so as to support a good ball of earth when they are removed; you should also support their stems with stakes, in order to make them straight, otherwise they are very apt to grow crooked and unsightly.

When the plants have been thus managed three or four years, you may transplant them into the places where they are designed to remain. The best time for this work is the latter end of September, or the beginning of October; but in removing them, you should dig round their roots, and cut off all down-right or strong roots, which have shot out to a great distance, that you may the better preserve a ball of earth to each plant, otherwise they are subject to miscarry; and when you have placed them in their new quarters, you should lay some mulch upon the surface of the ground to prevent its drying. You should also support the plants with stakes, until they have taken fast hold of the earth, to prevent their being turned out of the ground, or displaced by the winds, which will destroy the fibres that were newly put out, and greatly injure the plants. These trees delight in a middling soil, which is neither too wet and stiff, nor too dry, though the latter is to be preferred to the former, provided it be fresh.

Those sorts with small leaves are commonly two years before they take root when laid, therefore they should not be disturbed, for the raising them out of the ground greatly retards their rooting.

If these plants are propagated by seeds, they should be sown in the autumn soon after they are ripe, for when they are kept out of the ground till spring, they do not grow the first year. The seeds will do best if they are sown in pots or boxes filled with light loamy earth, and placed under a garden frame where they may be screened from hard frost, but always exposed to the open air in mild weather. If the seeds are sown early in the autumn, the plants will appear

in the spring; but if they should not come up, the pots should be plunged into the ground in an east border, where they may only have the morning sun, in which situation they should remain the following summer; during which time they may be constantly kept clean from weeds, and in the autumn removed again under a frame for shelter in winter, and the spring following the plants will certainly come up, if the seeds were good. Toward the middle of April, the pots should be again plunged into the ground on an east border, to prevent the air from drying the earth through the pots, which is generally the case when the pots stand upon the ground; so that they must then be frequently watered, which should not be practised to these plants where it can be avoided. The Michaelmas following the plants should be carefully taken out of the pots, and planted in a nursery-bed, covering the surface with old tan to keep out the frost; and if the winter prove severe, they should be covered with mats, afterward they may be treated as the layers.

PHILLYREA OF THE CAPE. See MAUROCENA.

PHLOMIS. Tourn. Inst. R. H. 177. tab. 82. Lin. Gen. Plant. 642. [*φλομῖς*, so called of *φλέγω*, to burn, because in old time the peasants used to burn these plants to enlighten their chambers.] The Sage-tree, or Jerusalem Sage.

The CHARACTERS are;

The flower hath a permanent empalement of one leaf, having an oblong tube with five angles. It hath one petal, and is of the lip kind; the tube is oblong; the upper lip is oval, forked, and inflexed; the under is cut into three segments, the middle one being large and obtuse. It hath four stamina hid under the upper lip, two being longer than the other, terminated by oblong summits, and a germen divided into four parts, supporting a style the length of the stamina, crowned by an acute bifid stigma. The germen afterward become four oblong cornered seeds sitting in the empalement.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which contains the plants whose flowers have two short and two longer stamina, and the seeds sit naked in the empalement.

The SPECIES are,

1. PHLOMIS (*Fruticosa*) foliis subrotundis tomentosis crenatis, involucris lanceolatis caule fruticoso. Lin. Sp. 818. *Phlomis with roundish, woolly, crenated leaves, and a shrubby stalk. Phlomis fruticosa, salviæ folio latiore & rotundiore. Tourn. Inst. 177. Shrubby Jerusalem Sage, with a broader and rounder Sage leaf.*
2. PHLOMIS (*Angustifolia*) foliis ovato-lanceolatis tomentosis integerrimis, caule fruticoso. *Phlomis with oval, spear-shaped, woolly leaves which are entire, and a shrubby stalk. Phlomis fruticosa, salviæ folio longiore & angustiore. Tourn. Inst. 177. Shrubby Jerusalem Sage, with a longer and narrower Sage leaf.*
3. PHLOMIS (*Latifolia*) foliis oblongo-ovatis petiolatis tomentosis, floribus capitatis, caule fruticoso. *Phlomis with oblong, oval, woolly leaves having foot-stalks, flowers growing in large heads, and a shrubby stalk. Phlomis latifolia, capitata, lutea, grandiflora. Hort. Elth. 316. Broad-leaved Jerusalem Sage, with large yellow flowers growing in heads.*
4. PHLOMIS (*Herba Venti*) involucris setaceis hispidis, foliis ovato-oblongis scabris, caule herbacea. Hort. Upsal. 171. *Phlomis with bristly prickly involucre, oblong, oval, rough leaves, and an herbaceous stalk. Phlomis Narbonensis, hormini folio, flore purpurascens. Tourn. Inst. R. H. 178. Jerusalem Sage of Narbonne, with a Clary leaf and a purplish flower.*
5. PHLOMIS (*Tuberosa*) involucris hispidis subulatis, foliis cordatis scabris, caule herbacea. Hort. Upsal. 171. *Phlomis with awl-shaped prickly involucre, rough heart-shaped leaves, and an herbaceous stalk. Phlomis urticæ folio glabro. Amman. Ruth. 40. Jerusalem Sage with a smooth Nettle leaf.*
6. PHLOMIS (*Lychnitis*) foliis lanceolatis tomentosis, floralibus ovatis, involucris setaceis lanatis. Lin. Sp. Plant. 585. *Phlomis with spear-shaped woolly leaves, those under the flowers oval, and bristly woolly involucre.*

crums. Phlomis lychnitis. Clus. Hist. 27. *Narrow-leaved Jerusalem Sage.*

7. PHLOMIS (*Purpurea*) foliis ovato-lanceolatis crenatis, subtus tomentosis, involucris setaceis. *Phlomis with oval spear-shaped leaves, which are woolly on their under side, and have a bristly involucre.* Phlomis fruticosa Lusitanica, flore purpurascens, foliis acutioribus. Tourn. Inst. 178. *Shrubby Portugal Phlomis with a purplish flower, and acute-pointed leaves.*

8. PHLOMIS (*Samia*) foliis cordatis acutis subtus tomentosis, involucris strictis tripartitis. *Phlomis with acute-pointed heart-shaped leaves, which are woolly on their under side, and the covers of the flowers divided into three parts.* Phlomis Samia herbacea, folio lunariæ. Tourn. Cor. 10. *Herbaceous Samian Jerusalem Sage, with a Moon-wort-leaf.*

9. PHLOMIS (*Orientalis*) foliis cordatis rugosis subtus tomentosis, involucris lanatis, caule herbaceo. *Phlomis with rough heart-shaped leaves, which are woolly on their under side, woolly covers to the flowers, and an herbaceous stalk.* Phlomis orientalis lutea herbacea latifolia, verticillata. Phil. Transf. vol. 34. *Yellow, herbaceous, eastern Jerusalem Sage, having a broad leaf, and flowers growing in whorls.*

10. PHLOMIS (*Flavescenta*) foliis lanceolatis crenatis subtus tomentosis, involucris lanatis, caule fruticoso. *Phlomis with spear-shaped crenated leaves, which are woolly on their under side, woolly covers to the flowers, and a shrubby stalk.* Phlomis angustifolia lutea, cymis flavescentibus. Sherard. Phil. Transf. N° 376. *Yellow narrow-leaved Jerusalem Sage, with yellowish tops.*

11. PHLOMIS (*Nissolia*) foliis radicalibus cordatis utrinque tomentosis villosis. Lin. Sp. Plant. 585. *Phlomis whose lower leaves are heart-shaped, woolly, and hairy on every side.* Phlomis orientalis, foliis auriculatis incanis, flore luteo. Nissol. *Eastern Jerusalem Sage, with hoary eared-leaves, and a yellow flower.*

12. PHLOMIS (*Ferruginea*) involucris lanceolatis, foliis cordatis subtus tomentosis, caule suffruticoso. *Phlomis with spear-shaped involucre, heart-shaped leaves which are woolly, and a shrubby stalk.* Phlomis Hispanica, fruticosa, candidissima, flore ferrugineo. Tourn. Inst. 178. *Whitest, shrubby, Spanish Jerusalem Sage, with an iron-coloured flower.*

13. PHLOMIS (*Rotundifolia*) involucris subulatis, foliis cordato-ovatis subtus tomentosis, caule fruticoso. *Phlomis with awl-shaped involucre, oval heart-shaped leaves which are woolly on their under side, and a shrubby stalk.* Phlomis fruticosa, flore purpureo, foliis rotundioribus. Tourn. Inst. 178. *Shrubby Jerusalem Sage with a purple flower, and rounder leaves.*

14. PHLOMIS (*Laciniata*) foliis alternatim pinnatis, foliolis laciniatis, calycibus lanatis. Lin. Sp. Plant. 585. *Phlomis with leaves alternately winged, whose lobes are cut, and having woolly empalements to the flowers.* Phlomis orientalis foliis laciniatis. Tourn. Cor. 10. *Eastern Jerusalem Sage with jagged leaves.*

The first sort grows naturally in Spain and Sicily; this hath a pretty thick shrubby stalk, covered with a loose bark rising five or six feet high, dividing into many irregular branches, which are four-cornered and woolly when young, but afterward become ligneous. Their joints are pretty far asunder; at each of these are placed two roundish leaves opposite, on short foot-stalks; they are woolly on their under side. The flowers come out in thick whorls round the stalks; they are yellow, and have two lips; the upper lip is forked, bending over the under, which is divided into three parts; the middle is broad, and stretched out beyond the two small side segments. The flowers appear in June, July, and August, but are very rarely succeeded by seeds here.

The second sort hath a shrubby stalk like the first, but does not rise so high. The branches are weaker; the leaves are spear-shaped and oval, being longer, narrower, and rounder at both points than the former; the whorls of flowers are smaller, but the flowers are of the same shape and colour. It flowers about the same time as the former.

These two sorts have been long propagated in the Eng-

lish gardens by the title of Sage-tree, or Jerusalem Sage. The plants were formerly kept in pots, and housed in winter with other exotic plants; but of late years they have been planted in the open air, where they are seldom injured by cold, unless in very severe winters; so they are intermixed with other shrubs of the same growth in quarters of wilderness-work, where they add to the variety; for as they retain their hoary woolly leaves all the year, they make a good appearance in winter; and their yellow flowers, which continue great part of the summer, being intermixed with their hoary leaves, have a good effect.

These plants should have a dry soil and a warm sheltered situation, otherwise they will not live in the open air. They may be planted among Cistuses of all the different kinds, the shrubby Moon-trefoil, evergreen Cytisus, Wormwood-tree, and some other exotic shrubs of the same countries, which require a warm situation and a dry soil, being too tender for open plantations which are exposed to strong cold winds; and as they are not of long duration, they are better when separated from trees and shrubs which continue many years; for these rarely live above twelve or fourteen years in dry ground, and not more than half so long in cold moist land, or where they are not well sheltered.

They are propagated by cuttings, which if planted in a bed of light earth in April, just before the plants begin to shoot, and covered with mats to screen them from the sun every day, as also to observe when the ground is dry to give them water gently, they will get good roots in about two months or ten weeks, when they may be carefully taken up, and transplanted into a nursery, where they may remain one year, and then be transplanted to the places where they are designed to stand, for these plants will not bear transplanting at a greater age.

The third sort hath a shrubby stalk like the former, but much lower, seldom rising more than three feet and a half high, sending out branches on every side, which are garnished with broader hoary leaves than either of the former; these are of an oblong oval form, and have pretty long foot-stalks; they are whiter than those of the former. The flowers grow in large whorls or heads, which generally terminate the branches; they are larger than those of the other sorts, and the upper lip is very hairy. These appear about the same time as those of the other sorts. The plants are equally hardy, and may be propagated by cuttings in the same way as is before directed for them.

The fourth sort grows naturally in the south of France and in Italy; this hath a perennial root, and an annual stalk which rises about two feet high, and decays in the autumn. When the roots are large, they send up a great number of square stalks, which are covered with a hairy down, and garnished with oblong, oval, rough leaves placed opposite, sitting close to the stalks. The flowers grow in whorls round the stalks, having stinging bristly covers; they are of a bright purple colour, so make a pretty appearance. They appear at the same time with the former, but are rarely succeeded by seeds in England.

This may be propagated by parting the roots; the best time for doing this is in the autumn, when the stalks begin to decay, that they may get root before the frost comes on; but they should not be parted oftener than every third or fourth year, if they are expected to have many flowers. This sort is hardy, so may be planted in exposed places, but it should not be planted in moist ground.

The fifth sort grows naturally in Tartary; this hath a perennial root. The stalks are purple, have four corners, and rise five or six feet high, garnished with heart-shaped leaves placed opposite; they are six inches long, and three broad at their base, but terminate in acute points, and are deeply crenated on their edges. The flowers grow in whorls round the stalks; their covers are awl-shaped, and are set with stinging hairs; they are of a pale purple colour and hairy. These appear

pear in June and July, and are succeeded by seeds which ripen in September; soon after which the stalks decay, but the roots will abide many years. It is propagated by seeds, which should be sown upon an east border in the spring, and when the plants come up, they must be kept clean from weeds the following summer, and in the autumn they should be transplanted where they are to remain; the following summer they will produce flowers and seeds. This sort is very hardy, so will thrive in almost any soil or situation.

The sixth sort grows naturally in the south of France, in Spain and Italy; the root is perennial, and the stalk annual. This sends out long, narrow, woolly leaves from the roots in tufts, which are enveloped at their base by a common covering; they are soft to the touch, and lie upon the ground. The stalks are slender, and near two feet long; their joints are far asunder; at each of these stand two oval leaves opposite, which embrace the stalk with their base. The whorls of flowers are also encompassed by these leaves, and within them is situated a radiated bristly involucre, which covers the flowers, which are yellow, and shaped like those of the other sorts. These appear in July, but are rarely succeeded by seeds in England. The stalks decay in the autumn, but the lower leaves remain all the year. It may be propagated by slips in the spring, and the plants require a dry soil and a warm situation.

The seventh sort grows naturally in Portugal and Spain. This hath a shrubby stalk which rises four or five feet high, sending out slender branches, which have four angles covered with a white bark, garnished with oval spear-shaped leaves about four inches long, and an inch and a half broad at their base; they are crenated on their edges, and woolly on their under side, standing upon very short foot-stalks. The flowers come out in whorls at each joint; they have bristly involucres, and are of a deep purple colour. This flowers in June and July, but does not ripen seeds in England. It may be propagated by cuttings in the same way as the three first sorts, and the plants require the same treatment.

The eighth sort was discovered by the late Dr. Tournefort in the Levant, where it grows naturally; this hath a perennial root and an annual stalk. The leaves of this are heart-shaped; those at the root are three inches long, and an inch and a half broad at their base, ending in acute points; they are downy on their under side, and have five strong veins. The stalks rise a foot and a half high, and are garnished at each joint with two leaves placed opposite, of the same form as the lower, but smaller. The flowers grow in whorls round the stalks; they are of a worn-out purple colour; their involucres are cut into segments, and are closely shut. This never produces seeds here, and the roots increase very slowly, so that now it is very rare in Europe; for before the severe winter in 1740, these plants had lived abroad in warm borders upward of twenty years, so that there were none of the plants kept in pots, and that year they were almost all destroyed in England.

The seeds of the ninth sort were sent from Smyrna by the late Consul Sherard to the Chelsea Garden, where the plants were raised; this hath a perennial root and an annual stalk. The lower leaves are near three inches long, and an inch and a half broad, standing upon long woolly foot-stalks; they are rough on their upper side, but woolly on their under, and are heart-shaped and entire. The stalks, which rise a foot high, are very downy; the flowers grow in whorls round the stalks; they have very long tubulous empalements covered with down; they are very large, and of a bright yellow, so make a good appearance. It flowers the latter end of June, and in July, but never ripens seeds in England. This sort hath survived many winters in the open air in the Chelsea Garden, but in the year 1740 they were all destroyed.

The seeds of the tenth sort were also sent from Smyrna by the same gentleman, and several of the plants were

raised in the Chelsea Garden. This hath shrubby stalks which rise about three feet high, and are covered with a yellowish down, sending out many slender irregular branches, garnished with narrow spear-shaped leaves, which are covered with a yellowish down on their under side. The flowers are produced in heads at the end of the branches; their involucres are very downy; the flowers are smaller than those of either of the first sorts, and are of a dirty yellow colour. This approaches near to the second sort, but the leaves are much smaller, the branches are slenderer, and are covered with a yellow down, especially toward the end of the branches. The whorls of flowers are not near so large, and are generally produced at the end of the branches.

This sort may be propagated by cuttings in the same way as the three first sorts, and the plants may be treated in the like manner, with this difference only, of planting them in a warmer situation, for it will not bear so much cold, though in a warm border the plants have lived several years abroad in the Chelsea Garden.

The eleventh sort grows naturally in the Archipelago, and also in Spain, from both which countries I have received the seeds. This plant hath an annual stalk, but the root is perennial, as are also the lower leaves, which do not arise from the root immediately, but stand in clusters upon short, trailing, woolly branches; they have very long downy foot-stalks, and are placed without order; they are heart-shaped, and downy on both sides, about four inches long, and two broad toward their base. The stalks are slender, and rise a foot high, garnished with oval spear-shaped leaves, which gradually decrease in size to the top, where they are not half an inch long. These stalks generally send out two side branches opposite, near the bottom, and from this division to the top are garnished with thin whorls of yellow flowers, which are not closely joined together as in the other species, but each flower stands separate. Their empalements are oval, very downy, and closely shut up. The flowers appear in June and July, but there are seldom any seeds produced in England. This sort may be propagated by slips in the same manner as the sixth sort, and the plants should be treated in the like way.

The twelfth sort grows naturally in Spain and Portugal; this hath an almost shrubby stalk, which is a little ligneous, and rises about two feet and a half high, covered with a thick white down. There are many of the stalks which arise from the same root, garnished with heart-shaped leaves about two inches long, and one broad toward their base; and from the lower part of the stalks, at each joint, there are two short shoots come out opposite, which have four or six small leaves of the same shape with the others, and are covered with a very white down. The flowers are produced in small whorls toward the upper part of the stalk; they have downy spear-shaped involucres; the flowers are short, and of an iron colour. They appear in June and July, but the plants produce no seeds in England.

This sort multiplies by its spreading roots, so that they may be divided every other year; the best time for doing this is about the middle of September, that the offsets may get root before the frost comes on; but there should be some mulch laid about their roots to prevent the frost from penetrating the ground. It may be also propagated by cuttings in the same way as the three first sorts, during the spring and summer months. The plants require the same treatment as the tenth sort, for they are not so hardy as the three first sorts; therefore, if there is some tanners bark, or other mulch laid upon the surface of the ground about their roots every winter, it will be a means of preserving the roots; so that if a severe winter should kill the stalks, the roots will put out new ones the spring following.

The thirteenth sort grows naturally in Spain and Portugal. This rises with several shrubby stalks from three to four feet high, which divide into several four-cornered

cornered branches covered with a woolly down, and garnished with leaves which on the lower part of the stalks are heart-shaped, but upward they are of an oval spear-shape, and woolly on their under side; they stand opposite upon short foot-stalks. The flowers come out in whorls round the stalks; they have awl-shaped involucrum ending in acute points, and covered with down; the flowers are of a bright purple colour, and appear in June, but are not succeeded by seeds in this country. This sort is propagated by cuttings in the same way as the three first sorts, and the plants should be treated in the like manner as hath been before directed for the tenth sort.

The fourteenth sort was discovered by Dr. Tournefort in the Levant, from whence he sent the seeds to the Royal Garden at Paris, where they succeeded. This sort hath a perennial root and an annual stalk which decays in the autumn, but the lower leaves continue all the year; these are alternately winged, and the small lobes are cut on their edges. The stalks rise a foot and a half high, garnished with leaves of the same shape with the lower, but are smaller. The flowers come out in whorls round the stalks, like those of the other sorts, whose empalements are downy; they are of a worn-out purple colour, and appear in June, but the seeds do not ripen here.

It is propagated by offsets from the root in the same way as the eighth sort, but these are sent out sparingly also, and the plants require the same treatment as those of the eighth sort. It is at present very rare in England, for the severe frost in the year 1740 destroyed all the plants in England, many of which had survived all the winters for twenty years before in the open air.

All the species of this genus are ornamental plants when properly disposed in gardens, so deserve a place there, for there is generally a succession of flowers on them for two or three months, and their hoary downy leaves, when intermixed with plants whose leaves are green, make a pretty contrast.

The leaves of the two first sorts have been greatly recommended by some persons to be used as tea for sore throats.

PHLOX. Lin. Gen. Plant. 197. Lychnidea. Dill. Hort. Elth. 166. Lychnidea, or Bastard Lychnis.

The CHARACTERS are,

The flower has a cylindrical empalement of one leaf, which is permanent, and hath five acute indentures at the top. It has one funnel-shaped petal, with a cylindrical tube narrow at the base, where it is incurved, and plain at the top, and is cut into five equal roundish segments which spread open. It hath five short stamina situated within the tube, two of which are longer than the tube, terminated by summits in the chaps of the flower. It hath a conical germen, supporting a slender style the length of the stamina, crowned by an acute trifid stigma. The germen afterward turns to an oval capsule with three cells sitting in the empalement, each cell containing a single seed. This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style; but were it not for the number of stamina, it would be better placed among the ringent plants in the second section of his fourteenth class, the structure of the flower being the same with those there ranged.

The SPECIES are,

1. PHLOX (*Glaberrima*) foliis lineari-lanceolatis glabris acuminatis, caule erecto ramoso, corymbo terminali. Lin. Sp. 217. *Phlox with smooth, narrow, spear-shaped leaves ending in acute points, and upright branching stalks terminated by flowers, which grow in a corymbus.* Lychnidea Virginiana, holostei ampliore folio, floribus umbellatis purpureis. Rand. Phil. Transf. vol. 34. *Virginia Bastard Lychnis with a larger Stitch-wort leaf, and purple flowers growing in umbels.*
2. PHLOX (*Carolina*) foliis lanceolatis lævibus, caule scabro corymbus, subfastigiatis. Lin. Sp. 216. *Phlox with smooth spear-shaped leaves, and upright stalks terminated by flowers growing in a corymbus.* Lychnidea Caroliniana, floribus quasi umbellatim dispositis, fo-

liis lucidis crassis acutis. Martyn. Dec. 1. *Bastard Lychnis of Carolina, with flowers disposed as it were in an umbel, and thick, shining, acute leaves.*

3. PHLOX (*Maculata*) foliis lanceolatis lævibus, racemoso opposito corymbofo. Lin. Sp. Plant. 216. *Phlox with spear-shaped leaves which are smooth, and branching opposite flowers.* Lychnoides Marylandica, foliis binis oppositis basi & auriculis caulem utrinque amplexicaulibus. Raii Supp. 459. *Maryland Bastard Lychnis with leaves growing opposite, whose base embraces the stalks on both sides.*
4. PHLOX (*Divaricata*) foliis lato-lanceolatis, superioribus alternis, caule bifido pedunculis geminis. Lin. Sp. Plant. 217. *Phlox with broad spear-shaped leaves placed alternately at the top, and a branching stalk.* Lychnidea Virginiana, alfinæ aquaticæ foliis, floribus in ramulis divaricatis. Pluk. Mant. 121. *Bastard Lychnis of Virginia with Water Chickweed leaves, and flower-branches diverging from each other.*
5. PHLOX (*Paniculatis*) foliis lanceolatis margine scabris, corymbis paniculatis. Lin. Sp. Plant. 216. *Phlox with spear-shaped leaves having rough borders, and flowers disposed in a compound corymbus.* Lychnidea Virginiana, umbellata maxima, Lysimachix luteæ foliis amplioribus, binis ex adverso positis. Pluk. Mant. 121. *Bastard Lychnis of Virginia with the largest umbel, and large yellow Loostripe leaves placed opposite by pairs.*
6. PHLOX (*Pilosa*) foliis lanceolatis villosis, caule erecto, corymbo terminali. Lin. Sp. Plant. 216. *Phlox with hairy spear-shaped leaves, and an upright stalk terminated by a corymbus of flowers.* Lychnoides Marylandica, calycibus lanuginosis, foliis angustis acutis. Raii Supp. 490. *Bastard Lychnis of Maryland, with woolly empalements to the flowers, and narrow acute-pointed leaves.*
7. PHLOX (*Ovata*) foliis ovatis, floribus solitariis. Lin. Sp. Plant. 152. *Phlox with oval leaves and solitary flowers.* Lychnidea fistulosa Marylandica, clinopodii vulgaris folio, flore amplo singulari. Pluk. Mant. 122. *Fistulous Bastard Lychnis of Maryland, with a Field Basil leaf, and large flowers growing singly.*

The first sort grows naturally in Virginia, and in some other parts of North America, but has been several years pretty common in the English gardens. This hath a perennial root, which sends up several stalks, in number proportionable to the size of the roots; these rise near a foot and a half high, and divide into three or four small branches toward the top, which are terminated by a corymbus of flowers. The leaves on the lower part of the stalks are placed opposite, and are about three inches long, and near half an inch broad at their base, ending in long acute points; they are smooth, and set close to the stalks; the leaves on the upper part of the stalks are placed alternate. The flowers grow on the top of the stalks in a sort of corymbus, or rather in form of an umbel, many of them arising from the same point, standing on short foot-stalks; their empalements are tubulous, and have ten angles or furrows, and are cut at the top into five acute segments; the tube of the flower is twice the length of the empalement, and is divided at the top into five roundish segments which spread open; these are of a light purple colour, and appear in June, but unless the season proves warm, they are not succeeded by seeds in England.

The second sort grows naturally in Carolina; this hath a perennial root, from which arise several rough stalks near two feet high, garnished with stiff shining leaves placed opposite, sitting close to the stalks; they are spear-shaped, entire, and their edges are reflexed; the upper part of the stalk has generally two slender side branches, and is terminated by a head of flowers, which grow in whorls round the stalks; but the whorls are so nearly placed, as to appear one corymbus at some distance. The empalement of the flower is short, and deeply cut into five acute segments; the tube of the flower is long, and at the top is cut into five roundish segments, which spread open. These flowers are of a deeper purple colour than those of the former, and are a fortnight later before they appear.

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The third sort grows naturally in Maryland; this hath a perennial root, from which arise several upright stalks of a purplish colour, closely covered with white spots; these grow about three feet high, and are garnished with heart spear-shaped leaves which are smooth, about three inches long and one broad at their base, ending in acute points. Toward the upper part of the stalks are sent out small branches opposite, each being terminated by a small bunch of flowers; but the principal stalk is terminated by a long loose spike of flowers, composed of small bunches arising from the wings of the stalk at each joint, each cluster having one common foot-stalk near an inch long, but the simple foot-stalks of the flowers are short; the flowers are of a bright purple colour, and appear late in July; so that if the season is temperate, or the soil in which they grow moist, they will continue in beauty great part of August, but are rarely succeeded by seeds in England.

The fourth sort grows naturally in North America; this has a perennial root, from which arise several slender stalks, which are apt to incline to the ground if they are not supported; these divide into several small branches, which spread from each other; the lower part of the stalks are garnished with broad spear-shaped leaves placed alternate, sitting close to the stalks, and on the smaller branches they are narrower, and placed opposite. The flowers grow in loose bunches at the end of the branches; they have short empalements, which are cut into five, narrow, acute segments; the tube of the flower is long and slender, the segments at the top are broad and heart-shaped, inverted. They are of a light blue, and appear the latter end of May or the beginning of June, but are rarely succeeded by seeds in England.

The fifth sort grows naturally in North America; this hath a perennial root and an annual stalk, which is smooth, of a light green, and rises about two feet high, sending out a few side branches, garnished with spear-shaped leaves placed opposite, near three inches long and one broad at the middle, drawing to a point at each end, sitting close to the stalks; they are of a dark green, and their edges are a little rough. The flowers are disposed in a corymbus at the top of the stalks, composed of many smaller bunches of flowers, which have each a distinct foot-stalk, and support a great number of flowers, which stand upon short slender foot-stalks; the empalement of the flower is short, and cut almost to the bottom into five narrow acute segments; the tube of the flower is long and slender, and is cut at the top into five oval segments which spread open. The flowers are of a pale purple colour, and appear late in July, but these are often succeeded by seeds which ripen in autumn.

The sixth sort grows naturally in Virginia; this hath a perennial root, from which arise a few stalks about a foot high, garnished with narrow spear-shaped leaves, ending in acute points, sitting close to the stalks, and are a little hairy. The flowers are produced in a loose corymbus at the top of the stalk; their empalements are cut into acute segments almost to the bottom; the tube of the flower is slender and pretty long, and is cut at the top into five oval segments, which spread open. The flowers are of a light purple colour, and appear the latter end of June, but are seldom succeeded by seeds in England.

The seventh sort grows naturally in Maryland, and other parts of North America. This hath a perennial root, from which comes out two or three slender stalks about nine inches high, garnished with oval, rough, hairy leaves, an inch and a half long, and about three quarters of an inch broad in the middle; they are placed opposite upon very short foot stalks. The flowers come out singly at the top of the stalk; they have very slender tubes, but are cut into five roundish segments, which spread open. They are of a light purple colour, and appear in July, but are not succeeded by seeds in England.

These plants are hardy, so will thrive in the open air in England; they delight in a moist rich soil, not too

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stiff, in which they will grow tall, and produce much larger bunches of flowers than in dry ground; for when the soil is poor and dry, they frequently die in summer, unless they are duly watered.

They are generally propagated by parting their roots, because they do not often produce seeds in England. The best time for this is in autumn, when their stalks begin to decay. These roots should not be divided into small heads, if they are expected to flower well the following summer; nor should they be parted oftener than every other year, because when they are often removed and parted, it will greatly weaken the roots, so that they will send out but few stalks, and those will be so weak as not to rise their usual height, and the bunches of flowers will be much smaller.

When the roots are transplanted and parted, it will be a good way to lay some old tan, or other mulch, upon the surface of the ground about their roots, to prevent the frost from penetrating the ground; for as they will have put out new fibres before winter, so the frost when it is severe often kills the fibres, whereby the plants suffer greatly, and are sometimes destroyed.

The first, second, and fifth sorts, propagate pretty fast by their spreading roots, but the others increase but slowly this way, therefore the best method to propagate them is by cuttings; and if the three first sorts are desired in plenty, they may be easily obtained by this method. The best time to plant the cuttings, is about the latter end of April or the beginning of May, when the shoots from the roots are about two inches high; these should be cut off close to the ground, and their tops should be shortened; then they must be planted on a border of light loamy earth, and shaded from the sun until they have taken root; or if they are planted pretty close together, and covered with bell or hand-glasses, shading them every day from the sun, they will put out roots in five or six weeks; but when they begin to shoot, the glasses should be gradually raised to admit the free air to them, otherwise they will draw up weak and soon spoil: as soon as they are well rooted, the glasses should be taken off, and the plants inured to the open air; then they should be soon after removed into a bed of good soil, planting them about six inches distance every way, observing to shade them from the sun, and water them duly till they have taken new root; after which, if they are kept clean from weeds, they will require no other care till autumn, when they should be transplanted into the borders of the flower-garden, where they are designed to remain.

If some of these plants are put into pots, and sheltered under a hot-bed frame in winter, they will flower strong the following summer; and these may be placed in court-yards, or other places near the habitation, when they are in beauty, and being mixed with other flowers will be very ornamental.

PHYLICA. Lin. Gen. Plant. 236. Alaternoides. Com. Hort. Amst. 1. p. 1. *Bastard Alaternus*.

The CHARACTERS are,

The flowers are collected in a disk, sitting in a common receptacle, each having a permanent empalement, composed of three narrow oblong leaves. They have one perforated petal, with an erect conical tube, cut into five parts at the brim, and an acute scale at each division, which join together within, and five small stamina inserted under the scales, terminated by single summits. The germen is situated at the bottom of the petal, supporting a single style, crowned by an obtuse stigma. The germen afterward becomes a roundish capsule with three lobes, having three cells, each inclosing a single roundish seed, gibbous on one side, and angular on the other.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. PHYLICA (*Ericoides*) foliis linearibus verticillatis. Lin. Sp. Plant. 195. *Phyllica with narrow leaves growing in whorls. Alaternoides Africana, ericæ foliis, floribus albicantibus & muscosis.* Hort. Amst. 2. p. 1. tab.

tab. 1. *African Bassard Alaternus*, with *Heath* leaves and *white mossy flowers*.

2. PHYLICA (*Plumosa*) foliis lineari-subulatis, summis hirsutis. Prod. Leyd. 199. *Phylica* with narrow awl-shaped leaves, which are hairy at the top. *Chamaelæa* foliis angustis subtus incanis, floribus capitatis muscosis. Burm. Plant. Afr. 117. tab. 43. *Spurge Olive* with narrow leaves, which are hoary on their under side, and mossy flowers collected in heads.

3. PHYLICA (*Buxifolia*) foliis ovatis sparsis. Lin. Sp. Plant. 195. *Phylica* with oval leaves growing scatteringly. *Chamaelæa* folio subrotundo subtus incano floribus in capitulum collectis. Burm. Plant. Afr. 119. tab. 44. *Spurge Olive* with roundish leaves, which are hoary on their under side, and flowers collected in heads.

The first sort grows naturally at the Cape of Good Hope, from whence it was first brought to the gardens in Holland; but it also grows naturally about Lisbon, where there are large extents of ground covered with it, in the same manner as are many lands in England covered with *Heath*. This is a low bushy plant, seldom rising more than three feet high; the stalks are shrubby and irregular, dividing into many spreading branches, which are again divided into smaller. The young branches are closely garnished with short, narrow, acute-pointed leaves placed in whorls round the stalks, to which they sit close; they are of a dark green, and continue all the year. At the end of every shoot, the flowers are produced in small clusters sitting close to the leaves; they are of a pure white, and begin to appear in the autumn, continuing in beauty all the winter, and decay in the spring, which renders the plant more valuable. These flowers are not succeeded by seeds in England.

The second sort grows naturally at the Cape of Good Hope, from whence it was brought to the gardens in Holland. This hath an erect shrubby stalk, which rises near three feet high, covered with a purplish bark, and here and there some white down upon it; the leaves are narrow, short, and acute-pointed, sitting close to the branches in alternate order on every side; they are thick, nervous, and of a dark green on their upper side, but hoary on their under. The flowers are collected in small heads at the end of the branches; they are white, woolly, and fringed on their borders, cut into six acute segments at the top. These appear the beginning of winter, and continue long in beauty, but are not succeeded by seeds in England.

The third sort is a native of the same country as the former; this rises with a shrubby erect stalk five or six feet high; the stalks when old, are covered with a rough purplish bark, but the younger branches have a woolly down; these are garnished with thick oval leaves about the size of those of the *Box-tree*; they are veined, smooth, and of a lucid green on their upper side, but are hoary on their under; they have short foot-stalks, and stand without order on the branches. The flowers are collected in small heads at the end of the branches; they are of an herbaceous colour, so make no great figure. These appear at the same time with the former.

As these plants do not produce seeds in England, so they are propagated by cuttings, which, if properly managed, will take root freely. There are two seasons for planting these cuttings; the first is the latter end of March, before the plants begin to shoot; if these are planted in pots and plunged into a very moderate hot-bed, covering them close with bell or hand-glasses, observing to shade them from the sun in the middle of the day, and to refresh them gently with water, they will put out roots in two months; then they should be inured to the open air, and after they have obtained strength, they should be carefully taken out of these pots, and each planted in a separate small pot, filled with soft loamy earth, and placed in a shady situation until they have taken new root, when they may be removed to a sheltered situation, where they may remain till autumn.

The other season for planting these cuttings is about the beginning of August; at this time they may be planted in pots, which may be either plunged into

an old hot-bed or in the ground, covering them close with bell or hand-glasses as before, and treating them in the same way; these will put out roots in about two months, but it will then be too late in the season to transplant them, so they must remain in the same pots till spring. If these are placed under a hot-bed frame in autumn, where they may be protected from the frost, and exposed to the open air in mild weather, they will succeed better than when they are more tenderly treated.

The plants are too tender to thrive in the open air in England, so they must be kept in pots and housed in winter; for although the first sort will live through the winter in a warm sheltered situation when the seasons prove favourable, yet when severe frosts happen they are always destroyed; but they require no artificial heat to preserve them, if they are sheltered under a hot-bed frame in winter when they are young, and after they are grown large kept in a green-house, where they may enjoy the free air in mild weather, and treated in the same way as other hardy exotic plants from the same country; in the summer they must be placed abroad in a sheltered situation, with which management the plants will thrive and continue several years; and as they flower in the winter, they make a good appearance in the green-house during that season.

PHYLLANTHUS. Lin. Gen. Plant. 932. Sea-side Laurel.

The CHARACTERS are,

It hath male and female flowers in the same plant; the empalements of the flower in both sexes are permanent, bell-shaped, and of one leaf, cut into six parts which spread open, and are coloured. The flowers have no petals according to some, or no empalements according to others. The male flowers have three short stamina which join at their base, but spread asunder at their top, and are terminated by twin summits. The female flowers have an angular nectarium surrounding the germen, which is roundish and three-cornered, supporting three spreading styles, crowned by obtuse stigmas. The germen afterward becomes a roundish capsule with three furrows, having three cells, each containing a single roundish seed.

This genus of plants is ranged in the third section of Linnæus's twenty-first class, which includes those plants which have male and female flowers on the same plant, and the male flowers have three stamina.

The SPECIES are,

1. PHYLLANTHUS (*Epiphilanthus*) foliis lanceolatis serratis, crenis floriferis. Hort. Cliff. 439. *Phyllanthus* with spear-shaped sawed leaves, having flowers growing on their edges. *Phyllanthus Americana* planta, flores è singulis foliorum crenis proferens. Hort. Amst. 1. p. 199. *American Phyllanthus*, with flowers growing out of every indenture of the leaves.
2. PHYLLANTHUS (*Niruri*) foliis pinnatis floriferis, floribus pedunculatis, caule herbaceo erecto. Flor. Zeyl. 331. *Phyllanthus* with winged leaves bearing flowers on foot-stalks, and an upright herbaceous stalk. *Niruri* Barbadoense, folio ovali subtus glauco petiolis florum brevissimis. Martyn. Cent. 9. tab. 9. *Barbadoes Phyllanthus* with an herbaceous upright stalk, and the flower-stalks very short.
3. PHYLLANTHUS (*Emblica*) foliis pinnatis floriferis, caule arboreo, fructu baccato. Flor. Zeyl. 333. *Phyllanthus* with winged leaves bearing flowers, a tree-like stalk, and berry-bearing fruit. *Nelli-Camarum*. Hort. Mal. 1. p. 69.

The first sort grows naturally upon the rocks near the sea, in all the islands of the West-Indies, where the inhabitants title it *Sea-side Laurel*. This is seldom found growing on the land, which occasions its scarcity in Europe; for the roots strike so deep into the crevices of the rocks, as to render it almost impracticable to transplant the plants, and it is very difficult to propagate by seeds; for unless they are sown soon after they are ripe, they will not grow, and the greatest part of the seed proves abortive, so that this sort is very rare in Europe. There was formerly a plant of this sort in the gardens at Hampton-court; but this, with many other fine plants, have been destroyed by the

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the ignorance of the gardeners. I also saw a fine plant of this sort in the Amsterdam Garden.

This tree grows about fifteen or sixteen feet high; the leaves come out without any order, which are five or six inches long, smooth, and thick; upon the edges of the leaves the flowers are produced, but especially toward the upper part, where they are placed very closely, so as almost to form a sort of border to the leaves; which, together with the shining green colour of the leaves, makes a very beautiful appearance: the leaves continue green all the year, which renders the plant more valuable.

It requires to be placed in a moderate stove in the winter, otherwise it will not live in England; but in summer it may be placed in the open air, in a warm sheltered situation. With this management the plant was in great vigour in the Physic Garden at Amsterdam.

The second sort grows naturally in Barbadoes, where it is a common plant; for I have many times had it come up in the tubs of earth brought from thence, with other plants: though this is an annual plant, yet the seeds being cast out of the capsules when ripe, with an elasticity, is thrown to a considerable distance, and this way the plant propagates itself in England; for the seeds being cast into the pots which are placed near it in the stove, the plants come up without farther trouble.

This rises with an herbaceous stalk a foot and a half high, garnished with many long winged leaves, composed of a great number of oval lobes, of a gray colour on their under side, but of a bright green on their upper; these lobes contract every evening, turning their under side outward; on the under side of the leaves the flowers are produced along the midrib, turning downward; these are some of them male, and others female, intermixed on the same plant, having each a bell-shaped empalement of one leaf, cut into six segments at the brim; and being coloured, the title of petals, or corolla, are by some applied to them, but others call them apetalous flowers. The male flowers have each three stamina, the female having a single style, supporting a trifid stigma, and are succeeded by roundish capsules with three cells, each containing one seed. The plant usually flowers from June to October, and the seed ripens after in succession.

The third sort grows naturally at Malabar, where it rises with a tree-like stalk to the height of twelve or fourteen feet; but in England they do not rise more than half that height, sending out from the side many patulus branches, which are garnished with very narrow winged lobes; but as it hath not produced either flowers or fruit in England, so I can give no farther account of it.

This plant is propagated by seeds, when they can be procured from the country where the plants grow naturally; these must be sown upon a hot-bed, and when the plants come up and are fit to transplant, they should be each planted into a separate small pot filled with light earth, and plunged into a hot-bed of tanners bark, being careful to shade and water them until they have taken good root; after this, the plants must constantly remain in the bark-stove, and be treated in the same manner as hath been directed for many other plants from the same country, with which the plant has been maintained several years, but has made little progress.

The other sorts, which in the former edition of this work were added to this genus, are now placed under ANDRACHNE.

PHYLLIS. Lin. Gen. Plant. 286. Bupleuroides. Boerh. Ind. alt. 71. Valerianella. Dill. Hort. Elth. 405. Simpla Nobla.

The CHARACTERS are,

The empalement of the flower is very small, composed of two leaves sitting on the germen. The flower has five obtuse spear-shaped petals, which turn backward. It hath five short hair-like stamina, which are flaccid, terminated by oblong summits. The germen, which is situated under

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the flower, has no style, but is crowned by two awl-shaped, reflexed, hairy stigmas. The germen afterward turns to an oblong angular fruit, containing two parallel seeds, convex on their outside, plain on the other, and broad at the top.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and two styles or stigmas.

We have but one SPECIES in the English gardens at present, viz.

PHYLLIS (*Nobla*) *stipulis dentatis.* Prod. Leyd. 92.

Phyllis with indented stipulæ. Bupleuroides quæ simpla nobla Canariensium. Pluk. Boerh. Ind. alt. 1. p. 72. *Bastard Hare's-ear, or Simpla Nobla of the Canaries.*

This plant grows naturally in the Canary Islands, from whence the seeds were formerly brought to England. It rises with a soft shrubby stalk about two or three feet high, which is seldom thicker than a man's finger, of an herbaceous colour, and full of joints. These send out several small side branches toward the top, garnished with spear-shaped leaves near four inches long, and almost two broad in the middle, drawing to a point at each end; they are of a lucid green on their upper side, but pale on their under, having a strong whitish midrib, with several deep veins running from it to the sides; the leaves are for the most part placed by threes round the branches, to which they fit close. The flowers are produced at the end of the branches, in loose panicles; they are small, of an herbaceous colour at their first appearance, but before they fade, change to a brown or worn-out purple, and are cut into five parts to their base, where they are connected, and fall off without separating, so should be termed a flower of one petal. These segments are reflexed backward so as to cover the germen, which is situated under the flower, and afterward becomes a short, turbinated, obtuse, angular fruit, which splits in two parts when ripe, each containing one seed, flat on the inside, convex on the outside and angular. This plant flowers in June, and the seeds ripen in autumn.

It is propagated by seeds, which must be sown on a bed of fresh light earth toward the end of March, and the plants will come up by the beginning of May; when they are fit to transplant, they should be put into separate pots, and placed in a shady situation until they have taken root; after which time they should be placed in a sheltered situation, where they may have the morning sun, and in the summer will require to be frequently watered. In winter they must be sheltered from the frost, but require to have as much free air as possible in mild weather; the second year the plants will flower, so if in the spring some of the plants are shaken out out of the pots and put into the full ground, they will perfect their seeds much better than those which remain in the pots.

As these plants seldom continue in health above four or five years, it will be proper to raise a supply of young plants to succeed them.

The plants retain their leaves all the year, which being large and of a shining green, make a handsome appearance in winter, in which the beauty of it consists, for the flowers have none.

PHYSALIS. Lin. Gen. Plant. 223. Alkekengi. Tourn. Inst. R. H. 150. tab. 64. Winter Cherry.

The CHARACTERS are,

The flower hath a small swelling permanent empalement of one leaf, which is five-cornered, and cut at the top into five acute points. The flower hath one wheel-shaped petal, with a short tube and a large brim, which is five-cornered and plaited. It has five small awl-shaped stamina which join together, terminated by erect summits, and a roundish germen supporting a slender style, crowned by an obtuse stigma. The germen afterward turns to an almost globular berry with two cells, inclosed in the large inflated empalement, and is filled with compressed kidney-shaped seeds.

This

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. *PHYSALIS* (*Alkekengi*) foliis geminis integris acutis, caule herbaceo inferne subramoso. Lin. Sp. Plant. 262. *Physalis with two leaves at a joint, which are sharp-pointed, and an herbaceous stalk which branches at bottom.* Alkekengi officinarum. Tourn. Inf. R. H. 151. *The common or officinal Winter Cherry.*
2. *PHYSALIS* (*Viscosa*) foliis geminis repandis obtusis subtomentosis, caule herbaceo superne paniculato. Lin. Sp. 261. *Winter Cherry with leaves growing by pairs, which are obtuse, a little woolly, and an herbaceous stalk.* Alkekengi Bonariense repens, baccâ turbinatâ viscosâ. *Creeping Winter Cherry of Buenos Ayres, with a viscous turbinate berry.*
3. *PHYSALIS* (*Pennsylvanica*) radice perenni, caule procumbente, foliis ovatis acutè dentatis, petiolis longissimis. *Physalis with a perennial root, a trailing stalk, and oval leaves which are acutely indented, and have very long foot-stalks.* Alkekengi Virginianum perenne majus, flore luteo amplo, fructu minimo. Rand. Act. Phil. N° 399. *Greater perennial Virginia Winter Cherry, with a large yellow flower and a small fruit.*
4. *PHYSALIS* (*Virginiana*) caule herbaceo, foliis ovato-lanceolatis acutè dentatis. tab. 206. fig. 1. *Winter Cherry with an herbaceous stalk, and oval spear-shaped leaves which are acutely indented.*
5. *PHYSALIS* (*Curassavica*) caule suffruticoso, foliis ovatis tomentosis integerrimis. *Physalis with a shrubby stalk, and oval downy leaves which are entire.* Alkekengi Curassavicum, foliis origani incanis, flore viêtè sulphureo, fundo purpureo. Boerh. Ind. alt. 2. p. 66. *Winter Cherry of Curassao with hoary Origan leaves, and a rusty sulphur-coloured flower with a purple bottom.*
6. *PHYSALIS* (*Somnifera*) caule fruticoso, ramis rectis, floribus confertis. Lin. Sp. Plant. 180. *Physalis with a shrubby stalk, erect branches, and flowers growing in clusters.* Alkekengi fructu parvo verticillato. Tourn. Inf. 151. *Winter Cherry with a small fruit growing in whorls.*
7. *PHYSALIS* (*Flexuosa*) caule fruticoso, ramis flexuosis, floribus confertis. Lin. Sp. Plant. 182. *Physalis with a shrubby stalk, flexible branches, and flowers growing in clusters.* Baccifera Indica, floribus ad foliorum exortus, fructu fulcato decapyreno. Raii Hist 1632. *Indian berry-bearing Plant, with flowers coming out from the foot-stalks of the leaves, and a furrowed fruit containing ten seeds.*
8. *PHYSALIS* (*Arborescens*) foliis ovato-lanceolatis integerrimis oppositis, caule fruticoso. tab. 206. fig. 2. *Physalis with oval, spear-shaped, entire leaves which are placed opposite, and a shrubby stalk.* Alkekengi Americanum arborescens, fructu sphaerico rubro, vesicâ atro-purpureâ. Houst. MSS. *Tree American Winter Cherry, with a red spherical fruit and a deep purple-coloured bladder.*
9. *PHYSALIS* (*Ramosa*) ramosissima, foliis villosis viscosis floribus pendulis. Lin. Sp. Plant. 262. *The most branching Physalis with hairy viscous leaves, and nodding flowers.* Alkekengi Virginianum fructu luteo. Tourn. Inf. 151. *Virginia Winter Cherry with a yellow fruit.*
10. *PHYSALIS* (*Angulata*) ramosissima, ramis angulatis glabris, foliis ovatis dentatis. Lin. Sp. Plant. 262. *The most branching Physalis with angular smooth branches.* Alkekengi Indicum majus. Tourn. Inf. 151. *Greater Indian White Cherry.*
11. *PHYSALIS* (*Minima*) ramosissima, foliis ovatis acuminatis subdentatis petiolis longioribus. *Very branching Physalis, with oval acute-pointed leaves which are somewhat indented, and have longer foot-stalks.* Alkekengi Indicum minimum, fructu virescente. Tourn. Inf. 151. *The least Indian Winter Cherry with a greenish fruit.*
12. *PHYSALIS* (*Patula*) ramosissima patula, ramis angulatis glabris, foliis lanceolatis pinnato-dentatis. *The most branching spreading Physalis, with smooth angular branches, and spear-shaped leaves which are indented like wings.*

13. *PHYSALIS* (*Villosa*) ramosissima, ramis villosis, foliis ovatis acuminatis ferrato-dentatis. *The most branching Physalis with hairy branches, and oval acute-pointed leaves, which are indented like a saw.* Alkekengi Americanum, annuum, ramosissimum, villosum, fructu rotundo ex luteo virescente. Houst. MSS. *The most branching, annual, hairy, American Winter Cherry, with a round, yellowish, green fruit.*

14. *PHYSALIS* (*Cordata*) caule erecto ramoso, foliis ovatis ferrato-dentatis, petiolis pedunculisque longissimis. *Physalis with an erect branching stalk, oval, indented, sawed leaves, and the foot-stalks of the leaves and flowers very long.* Alkekengi Americanum annuum, lamii folio, fructu cordato. Houst. MSS. *Annual American Winter Cherry, with a dead Nettle leaf and a heart-shaped fruit.*

15. *PHYSALIS* (*Maxima*) caule erecto ramoso, foliis ovato-lanceolatis viscosis, fructu maximo cordato. *Physalis with an erect branching stalk, oval, spear-shaped, viscous leaves, and a large heart-shaped fruit.* Alkekengi Americanum annuum, maximum viscosum. Houst. MSS. *The largest, annual, viscous, American Winter Cherry.*

16. *PHYSALIS* (*Peruviana*) caule erecto ramoso, ramis angulatis, foliis sinuatis, calycibus acutangulis. *Physalis with an erect branching stalk, angular branches, sinuated leaves, and empalements having acute angles.* Alkekengi amplo flore violaceo. Feuill. Obs. 724. tab. 16. *Winter Cherry with a large Violet-coloured flower.*

The first sort is the common Winter Cherry which is used in medicine; this grows naturally in Spain and Italy, but has been long cultivated in the English gardens. The roots of this are perennial, and creep in the ground to a great distance, if they are not confined; these shoot up many stalks in the spring, which rise about a foot high or better, and are garnished with leaves of various shapes; some are angular and obtuse, others are oblong and acute-pointed, of a dark green, and generally there are two leaves coming out from the same point on the same side of the stalk; they have long foot-stalks. The flowers are produced from the wings of the stalks, standing upon slender foot-stalks, having one white petal which has a short tube, and is cut at the brim into five angles spreading open. In the center of the tube is situated a roundish germen, supporting a slender style crowned by an obtuse stigma; this is accompanied by five stamina of the same length, terminated by oblong, erect, yellow summits which join together. The flowers appear in July, and are succeeded by round berries about the size of small Cherries, inclosed in an inflated bladder, which turns red in the autumn, when the top opens, and discloses the red berry, which is soft, pulpy, and filled with flat kidney-shaped seeds. Soon after the fruit is ripe, the stalks decay to the roots.

This plant is easily propagated, either by seeds or parting the roots; the latter being the most expeditious method is generally practised. These roots may be transplanted and parted, any time after the stalks decay, till the roots begin to shoot in the spring; they love a shady situation, and should be confined, otherwise they will ramble to a great distance in one year, and when the stalks stand at a distance they make no appearance. Their only beauty is in autumn, when the fruit is ripe, at which time their red bladders opening and disclosing the Cherry-shaped fruit, make a pretty appearance.

The leaves of this plant are cooling, and of the nature of common Nightshade; the berries are a singular good diuretic, and useful against the gravel and stone. There has been several instances of their great virtue in bringing away great quantities of gravel, when other remedies have been tried without success. The berries boiled in milk, and sweetened with sugar, cure the heat of the urine, making bloody water, and ulcers in the kidneys and bladder.

The second sort grows naturally at Buenos Ayres; this hath a creeping root, by which it multiplies very fast, sending up a great number of smooth stalks about a

foot high, which divide toward their top into small spreading branches, garnished with heart-shaped or oval leaves, about three inches long, and two broad near their base; they are entire and rough to the touch, of a pale yellowish green, standing upon pretty long foot-stalks placed alternately. The flowers come out from the wings of the stalks toward the top, and have long slender foot-stalks; they are of a dirty yellow colour with purple bottoms. They appear in June and July, and are succeeded by viscous berries about the size of the common fort, of an herbaceous yellow colour, inclosed in a swelling bladder, of a light green colour.

This plant is easily propagated by parting the roots either in spring or autumn, but it is too tender to live abroad through the winter in England, so they should be planted in pots, and sheltered under a hot-bed frame in winter, where they may enjoy the free air at all times in mild weather.

The seeds of the third sort were sent me from Virginia, where the plant grows naturally; this hath a perennial root and an annual stalk, but these roots do not creep in the ground like the two former. The stalks of this grow two feet long, and spread on the ground if they are not supported; these are garnished with oval leaves three inches long, and two inches and a half broad, standing alternately upon very long foot-stalks; they are of a pale green, having several acute indentures on their edges. The flowers come out from the wings of the stalk upon very short foot-stalks; they are larger than those of the common fort, and of a pale yellow colour. These are succeeded by very small yellowish berries which ripen in the autumn, when the season proves warm, but in cool moist summers they seldom ripen here.

This fort is propagated by seeds, which should be sown upon a warm border about the latter end of March; and when the plants come up, they should be thinned where they are too close, and kept clean from weeds till autumn, when they should be transplanted to the places where they are to remain, which should be in a warm situation, where they will live through the winter in mild seasons, but are killed by severe frost if they are not screened.

The seeds of the fourth sort were sent me from Philadelphia by Dr. Bensil, who found the plants growing there naturally. This hath a perennial root composed of strong fibres, from which arise two or three hairy stalks about nine or ten inches high, dividing into several branches which are garnished with oval spear-shaped leaves, of a pale green and hairy, about two inches and a half long, and an inch and a half broad, having several acute indentures on their edges, and stand alternately upon short foot-stalks. The flowers come out from the side of the branches, at the base of the foot-stalks of the leaves; these have long slender foot-stalks; the flowers have very short tubes, which are larger than in most of the species of this genus; they are of a sulphur colour, with a dark purple bottom. These appear in July, and in warm seasons are succeeded by oval yellowish berries, which ripen in the autumn. This fort may be propagated by seeds in the same way as the third, and the plants require the same treatment.

The fifth sort grows naturally at Curassao in the West-Indies. This hath a perennial creeping root, from which arise several slender stalks about a foot high, which become somewhat ligneous, but seldom last above two years, the leaves standing alternately upon short foot-stalks; they are about two inches long, and an inch and a half broad. The flowers come out from the wings of the stalk toward the top, standing upon short slender foot-stalks; these are garnished with oval downy petals, which are small, of a sulphur colour, and have dark purple bottoms. They appear in July and August, but are rarely succeeded by berries in England.

This is easily propagated by parting the roots in the spring, but the plants are too tender to live through the winter in England without artificial warmth, so

the pots should be placed in a moderate warmth in winter; but during the months of July, August, and September they may be placed in the open air in a warm situation.

The sixth sort grows naturally in Crete, Sicily, and Spain. This rises with a shrubby stalk near three feet high, dividing into several branches which grow erect, and are covered with a woolly down, garnished with oval spear-shaped leaves almost three inches long, and one and a half broad in the middle; they are downy, and stand upon short foot-stalks. The flowers come out in clusters on the side of the branches; they are small, of an herbaceous white colour, fitting very close to the branches, and are succeeded by small berries almost as large as those of the first fort, which when ripe are red. This flowers in June and July, and the berries ripen in autumn.

This plant is propagated by seeds, which may be sown on a bed of light earth the beginning of April, and when the plants are two or three inches high, they should be carefully taken up, and each planted in a separate small pot filled with earth out of a kitchen-garden, and placed in the shade till they have taken new root; then they may be removed to a sheltered situation, where they may remain till the beginning of October; at which time they should be removed into the green-house, for the plants are too tender to live through the winter in the open air, so they must be treated like the other green-house plants, but should be sparingly watered in winter. These plants will continue several years if they are not too tenderly treated.

The seventh sort grows naturally at Malabar, and also at the Cape of Good Hope. This rises to the height of five or six feet, sending out long flexible branches covered with a gray bark, and garnished with oblong oval leaves which are often placed opposite, and sometimes by threes round the branches, to which they fit close. The flowers are produced in clusters at the base of the foot-stalks of the leaves; they are small, and of an herbaceous yellow colour; these are succeeded by round purplish berries having ten cells, each including one seed. This plant flowers in July and August, but unless the season is warm, the berries do not ripen in England.

This is propagated by seeds, which should be sown upon a moderate hot-bed, and when the plants have four leaves, they should be transplanted on a fresh hot-bed, observing to shade them from the sun till they have taken new root; then they should have fresh air admitted to them every day in warm weather to prevent their drawing up weak, and should be treated in the same way as other exotic plants. When these are grown three or four inches high, they should be carefully taken up, and each planted in a separate small pot, filled with light loamy earth, and placed in a frame upon an old hot-bed, shading them from the sun till they have taken new root; then they should be gradually inured to bear the open air, into which they should be removed in July, and placed in a warm situation, where they may remain till the end of September; then they should be removed into shelter, and the first winter they should be placed in a moderate stove; but when the plants have obtained strength, they will live through the winter in a good green-house.

The eighth sort was discovered by the late Dr. Houstoun growing naturally at Campeachy, from whence he sent the seeds to England. This hath a shrubby stalk which rises ten or twelve feet high, dividing toward the top into several small branches, covered with a gray hairy bark, and garnished with oval spear-shaped leaves; those on the lower part are placed alternately, but toward the end of the branches they are opposite. The lower leaves are from three to four inches long, and two broad in the middle, drawing to a point at both ends; they are of a pale green, and are downy. The flowers come out from the wings of the stalks toward the end of the branches, sometimes one, and at other times two are produced at the same joint opposite;

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opposite; they stand upon short nodding foot-stalks. The flowers are small, of a pale dirty yellow colour, having purple bottoms; these are succeeded by small, spherical, red berries included in an oval, dark, purple bladder. It flowers in June and July, but unless the season proves warm, there are no berries succeeding them.

This may be propagated by seeds in the same way as the last-mentioned, and the plants require the same treatment, but are not so hardy, therefore they must be kept in a moderate stove in winter; but in the middle of summer, they should be placed in the open air in a sheltered situation for about three months; for if they are constantly kept in the stove, they will draw up weak, so will not flower. It may also be propagated by cuttings, which, if planted in pots during the spring and summer months, and plunged into a gentle warmth, will take root freely, and may be treated in the same way as is before directed for the sixth sort.

The ninth sort is an annual plant, which grows naturally in Virginia. This branches out very wide close to the ground, and the branches frequently lie upon it; they are angular and full of joints, dividing again into smaller branches, and are garnished with hairy viscous leaves, which are almost heart-shaped, standing upon pretty long foot-stalks; they are about three inches long and almost two broad, having several acute indentures on their edges. The flowers are produced on the side of the branches upon short, slender, nodding foot-stalks; they are of an herbaceous yellow colour with dark bottoms; these are succeeded by large swelling bladders of a light green, inclosing berries as large as common Cherries, which are yellowish when ripe. This sort flowers in June and July, and the berries ripen in the autumn.

If the seeds of this sort are permitted to scatter, the plants will come up in the spring, and require no other care but to thin them, and keep them clean from weeds; or if the seeds are sown in the spring on a common border, the plants will rise very well, and need no other care.

The tenth sort is also an annual plant, which grows naturally in the islands of the West-Indies; this rises with an upright branching stalk from two to three feet high. The branches are smooth, angular, and garnished with spear-shaped leaves ending in acute points, which are sharply indented on their edges. The flowers come out toward the end of the branches upon short slender foot-stalks; they are very small, of a dirty white colour, and are succeeded by berries the size of common Cherries, covered with an angular bladder; they are of a yellowish colour when ripe.

This sort is propagated by seeds, which should be sown on a moderate hot-bed, and when the plants come up and are a little advanced, they should be planted on a fresh hot-bed to bring them forward, and treated in the same way as the Capsicum. When they are grown strong, and are hardened to bear the open air, they may be transplanted with balls of earth to their roots into a warm border, observing to water and shade them till they have taken root; after which they will require no other care, but to keep them clean from weeds.

The eleventh sort grows naturally in the West-Indies; this is an annual plant with very branching stalks, which seldom rise above a foot high. The leaves are oval, of a deep green, and have long foot-stalks; the flowers are small, white, and stand upon short foot-stalks; the berries are small, and green when ripe.

The twelfth sort was discovered by the late Dr. Houstoun growing naturally at La Vera Cruz; this is a low annual plant, with a very branching spreading stalk. The leaves are spear-shaped, downy, and have deep indentures on their edges, which are opposite and regular like a winged leaf; the branches are smooth and angular; the flowers small and white; the fruit is small, and yellowish when ripe.

The thirteenth sort was discovered by the late Dr.

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Houstoun at La Vera Cruz; this is an annual plant with a very branching hairy stalk. The leaves are oval, acute-pointed, and indented like a saw on their edges; the flowers are small, and of a pale yellow colour; the fruit is round, as large as a Cherry, and of a yellowish green when ripe.

The fourteenth sort was discovered at La Vera Cruz by the same gentleman; this is an annual plant, with an upright branching stalk near two feet high, garnished with oval leaves, indented on their edges like a saw. They have long foot-stalks, and change to a purplish colour in the autumn. The flowers are small and white, standing upon very long foot-stalks, and are succeeded by large berries almost as large, and of the shape of Heart-Cherries, of a yellowish green, with some purple stripes.

The fifteenth sort was found by the same gentleman, growing naturally in the same country; this is an annual plant, with a smooth, erect, branching stalk near three feet high, garnished with oval, spear-shaped, viscous leaves, standing on long foot-stalks. The flowers are of a pale yellow, and small; these are succeeded by large heart-shaped fruit, of a pale yellow when ripe. The five last mentioned sorts are propagated by seeds in the same manner as the eleventh, and the plants require the same treatment.

The sixteenth sort grows naturally in Peru, from whence the younger de Jussieu sent the seeds. This is an annual plant, rising with a strong, herbaceous, angular stalk four or five feet high, of a purplish colour, dividing into several branches which are angular, and spread out wide on every side; these are garnished with oblong leaves which are deeply sinuated on their sides, and are of a deep green. The foot-stalks of the flowers are short; the empalement of the flower is large, bell-shaped, and deeply cut into five segments; the flower is large, of the open bell-shape, of a light blue colour, and is succeeded by berries about the size of common Cherries, inclosed in a large swelling bladder, having five sharp angles. It flowers in July, and the seeds ripen in the autumn, which if permitted to scatter, the plants will come up the following spring; or if the seeds are sown on a bed of rich earth in the spring, the plants will rise easily, and may be afterward transplanted to the borders of the pleasure-garden, where they must be allowed room, for if the ground is good, the plants will grow very large.

Father Feuille, who first discovered this plant in Peru, and has given a figure and description of it, recommends it greatly for its virtues, and says, the Indians make great use of its berries to bring away gravel, and to relieve persons who have a stoppage of urine, and gives the manner of using them; which is, to bruise four or five of the berries either in common water, or white wine, giving it to the patient to drink, and the success is astonishing.

PHYTOLOGICA. Tourn. Inst. R. H. 299. tab. 154. Lin. Gen. Plant. 521. [This plant is so called of *Φυτόν*, a plant, and *Lacca*, a colour, because a red coloured lacca is made thereof.] American Nightshade.

The CHARACTERS are,

The flower hath no petals according to some, or no empalement according to others, for the cover of the parts of generation being coloured, is by the latter termed petals; there are five of these which are roundish, concave, spreading open, and permanent. It has for the most part ten stamina which spread open, and are the same length as the petals, terminated by roundish summits, and ten compressed orbicular germen joined together on their inside, but are divided on their outside, upon which sit ten very short styles which are reflexed, and crowned by single stigmas. The germen afterward turns to an orbicular depressed berry, with ten longitudinal deep furrows, having ten cells, each containing a single smooth seed.

This genus of plants is ranged in the fifth section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and ten styles.

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The SPECIES are,

1. PHYTOLOACCA (*Vulgaris*) floribus decandris decagynis. Hort. Cliff. 117. *Phytolacca with flowers having ten stamina and ten styles. Phytolacca Americana, majori fructu. Tourn. Inst. 229. American Nightshade with large fruit, commonly called Virginian Poke, or Porké Physic.*
2. PHYTOLOACCA (*Mexicana*) foliis ovato-lanceolatis, floribus sessilibus. *Phytolacca with oval spear-shaped leaves, and flowers sitting close to the stalks. Phytolacca Mexicana, baccis sessilibus. Hort. Elth. 318. Mexican Phytolacca, whose berries grow close to the stalk.*
3. PHYTOLOACCA (*Icosandra*) floribus icosandris decagynis. Lin. Sp. 631. *Phytolacca with many stamina, which are fixed to the receptacle. Phytolacca spicis florum longissimis, radice annua. tab. 207. Phytolacca with the longest spikes of flowers, and an annual root.*
4. PHYTOLOACCA (*Dioica*) floribus dioicis, caule arboreo ramosa. *Phytolacca with a tree-like stem, which has male and female flowers on different plants.*

The first sort grows naturally in Virginia, and also in Spain and Portugal; this hath a very thick fleshy root, as large as a man's leg, divided into several thick fleshy fibres, which run deep in the ground. When the roots are become large, they send out three or four stalks, which are herbaceous, as large as a good walking-stick, of a purple colour, and rise the height of six or seven feet, dividing into many branches at the top, garnished with leaves about five inches long, and two inches and a half broad; they are rounded at their base, but terminate in a point, and are placed without order, having short foot-stalks; they are of a deep green, and in the autumn change to a purplish colour before they fall off. From the joints of the branches and at their divisions, come out the foot-stalks of the flowers, which are about five inches long; the lower part is naked, but the upper half sustains a number of flowers ranged on each side like common Currants. Each flower stands upon a foot-stalk half an inch long; the flowers have five purplish petals, within which stand the ten stamina and styles. After the flowers are faded, the germen turns to a depressed berry with ten furrows, having ten cells, filled with smooth seeds. It flowers in July and August, and in warm seasons the berries ripen in autumn.

It may be propagated by sowing the seeds in the spring upon a bed of light earth, and when the plants come up, they should be transplanted into the borders of large gardens, allowing them space to grow, for they must not be planted too near other plants, lest they overbear and destroy them, as they grow to be very large, especially if the soil is good. When they have taken root, they will require no farther care but only to clear them from weeds, and in the autumn they will produce their flowers and fruit; but when the frost comes on, it will cut down the stems of these plants which constantly decay in the winter, but their roots will abide in the ground, and come up again the succeeding spring.

The roots of this plant will continue many years, especially if they are planted in a dry soil, for wet in winter standing about the roots will cause them to rot; and sometimes the frost in very severe winters will kill them, if the surface of the ground is not covered with mulch, but in our ordinary winters they are never injured.

Parkinson says, that the inhabitants of North America make use of the juice of the root as a familiar purge; two spoonfuls of the juice will work strongly. Of late there have been some quacks, who pretend to cure cancers with this herb, but I have not met with one instance of its having been serviceable in that disorder. The inhabitants of North America boil the young shoots of this plant, and eat it like Spinach. The juice of the berries stain paper and linen of a beautiful purple colour, but it will not last long. If there could be a method of fixing the dye, it might be very useful.

The vigneron in Portugal, for many years made use of the juice of the berries of this plant to mix with

their red port wines when they made it, which gave a deep colour to the wine; and when there was too much of this juice added, it gave a very disagreeable taste to the wine; and complaint of this practice having been communicated to his Portuguese Majesty, he gave orders that the stems of the Phytolacca should be cut down and destroyed before they produced berries, to prevent the use of this juice for the future, in order to gain a better reputation to the wine of that country. Some of this unmixed wine I have drank, and found it much more palatable and lighter than any port wine I had ever before tasted; but whether this is still continued in that country, I cannot say.

The second sort grows naturally in the Spanish West-Indies; the late Dr. Houstoun found it growing in great plenty at La Vera Cruz, where the inhabitants constantly used it for their table. This plant is biennial, seldom continuing longer than two years; and when it flowers and produces plenty of seeds the first year, the plants frequently die before the following spring. This hath an herbaceous stalk about two feet high, about the size of a man's finger, dividing at the top into two or three short branches, garnished with oval-spear-shaped leaves near six inches long, and almost three broad, drawing to a point at each end; they have a strong longitudinal midrib, and several transverse veins running from that to the sides, of a deep green, and have foot-stalks an inch and a half long, placed without order on the stalk. The foot-stalks of the flowers come out from the side of the branches opposite to the leaves; they are seven or eight inches long; the lower part, about two inches in length, is naked; the remaining part is garnished with white flowers sitting close to the stalks, which are white, having a blush of purple in the middle, each being cut into five segments almost to the bottom, and have from eight to fourteen stamina, and ten styles in each flower, which are succeeded by flat berries, having ten deep furrows divided into so many cells, each containing one or two smooth seeds. This flowers in July and August, and the seeds ripen late in the autumn.

The third sort grows naturally in Malabar, from whence I received the seeds; this plant is annual, always perishing soon after it has perfected seeds, so that in this particular it differs greatly from the first; this rises with an herbaceous stalk from two to three feet high, which has several longitudinal furrows, and changes the latter part of summer to a purplish colour. It divides at the top into three or four branches, garnished with spear-shaped leaves six or seven inches long, and almost three broad in the middle, drawing to a point at each end; they are of a deep green, and have short foot-stalks; sometimes they stand alternately, at others they are placed opposite, and are frequently oblique to the foot-stalk. The foot-stalks of the flowers come out from the side of the branches opposite to the leaves; they are nine or ten inches long, the lower part being naked as in the other sorts, but this is much shorter than the other species; the other part is garnished with larger flowers than those of the other sorts; they are white on their inside, of an herbaceous colour on their edges, and purplish on their outside, standing upon short foot-stalks; these have not always the same number of stamina, some of them have but eight, and others nine or eleven, which are terminated by roundish summits. These flowers are succeeded by orbicular, compressed, soft berries divided by deep furrows on their outside into ten cells, each containing one smooth shining black seed; the racemus of flowers is very narrow at the top, where it is commonly inclined. This flowers in July and August, and the seeds ripen in the autumn, soon after which the plant decays.

The berries of this sort are very succulent, and their juice stains paper and linen of a beautiful purple colour, but it is not permanent.

These two sorts are not so hardy as the first, so their seeds should be sown upon a moderate hot-bed in the spring, and when the plants are fit to remove, they should

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should be transplanted to another hot-bed to bring them forward, observing to shade them from the sun till they have taken new root; after which they should be treated in the same way as other tender exotic plants, and the beginning of July they may be transplanted out upon a warm border, or into pots filled with light rich earth, and shaded from the sun till they have taken new root; after which they will require to be duly watered in dry weather, and kept clean from weeds. As these plants perfect their seeds every autumn, they may be easily preserved.

The fourth sort grows naturally in Mexico, from whence the seeds were sent to Paris some years past, and they have been sent to Spain many years since; for there are growing in some of the gardens, several trees which are now upward of twenty feet high; and I have been credibly informed, there are some of the trees which produce male, and others female flowers only; but as the plant in the Chelsea Garden has not as yet produced any flowers which have opened perfectly, so I cannot from my own observations determine this.

The plant hath a strong woody stem as large as a man's leg, which sends out many irregular branches, garnished with oval spear-shaped leaves six inches long, and almost three broad, having large midribs, which are of a purple colour when the leaves are fully grown; the flowers are produced at the base of the foot-stalks of the leaves, in a racemus like those of the other species; but as those on the plant in the Chelsea Garden were produced late in the season, so they dropped off before they opened.

This species may be propagated by cuttings during the summer months, which should be planted in pots filled with light earth and plunged into a moderate hot-bed, covering the pots with hand-glasses to exclude the air from the cuttings, and duly shading them from the sun; in about five or six weeks they will put out roots, when they may be each planted into a separate small pot, and plunged into the bed again, shading them daily till they have taken new root; then they should be gradually inured to the open air, where they may remain till the end of September, when they must be removed into a moderate stove for the winter season, for they will not live through the winter in a green-house, unless it is a very warm one.

PIERCEA. Solanoides. Tourn. Aët. Par. 1706.

The CHARACTERS are,

The flower has no petals; the empalement which incloses the parts of generation is composed of four oblong, oval, coloured leaves, which are by some called petals. It hath four stamina, which stand erect and close together, terminated by small summits. In the center is situated a large roundish germen, supporting a short style, crowned by an obtuse stigma. The germen afterward turns to a roundish berry sitting upon the reflexed empalement, having one cell, inclosing a rough seed of the same form.

I have taken the freedom of inscribing this genus of plants to his Grace the Duke of Northumberland, who is not only a great encourager of botanical studies, but greatly skilled in the science himself.

Tournefort first placed this with the Phytolacca, making it a species of that genus; but as the flowers of Phytolacca have five petals or leaves to the empalement, and ten stamina, and the flowers of this have but four petals and eight stamina, and the berries of Phytolacca have ten cells, and these have but one, so they could not with propriety be joined together; therefore upon mature consideration Tournefort constituted a new genus of it, by the title of Solanoides, and published the characters in the Memoirs of the Academy of Sciences for the year 1706; but as all those titles of plants which end with oides, have been by later botanists changed, so I shall join this to the first section of Linnæus's eighth class, who has supposed this to be the same with Plumier's Rivinia, so he has applied that title to this plant, and believed Plumier was mistaken when he drew eight stamina to the flower; but Plumier's Rivinia is totally different

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from this plant, and the flowers of it have eight stamina as Plumier has represented it.

The SPECIES are,

1. PIERCEA (*Glabra*) foliis ovato-lanceolatis glabris. *Piercea with oval, spear-shaped, smooth leaves.* Solanoides Americana, circææ foliis glabris. Tourn. Aët. Par. 1706. *American Solanoides with smooth Enchanters Nightshade leaves.*

2. PIERCEA (*Tomentosa*) foliis cordatis pubescentibus. *Piercea with heart-shaped downy leaves.* Solanoides Americana circææ foliis canescentibus. Tourn. Aët. Par. 1706. *American Solanoides with hoary leaves like Enchanters Nightshade.*

These plants grow naturally in most of the islands in the West-Indies, but the first is the most common there. This rises with a slender herbaceous stalk three or four feet high, and by age becomes a little ligneous at the bottom. It divides into many branches which are herbaceous, and have angles; these are garnished with oval spear-shaped leaves near four inches long, and two broad in the middle; they are of a bright green, and have slender foot-stalks an inch and a half broad. The foot-stalks of the flowers come out from the side of the branches, at the base of the foot-stalks of the leaves; they are from four to five inches long, sustaining a great number of small white flowers, ranged along the upper part on both sides. These are succeeded by small red berries full of a red juice, inclosing one hard seed of the same form.

There is a succession of flowers upon this plant most part of the year, which are succeeded by berries ripening after each other, so that the plants are seldom destitute of them; and although the flowers make but a small appearance, yet the long bunches of bright red berries, hanging on all the branches great part of the year, have a fine effect.

The second sort grows taller than the first, and the branches grow more erect; the leaves are smaller, heart-shaped, and covered with short hairy down; the spikes of flowers are not so long, and the flowers are not so closely placed together, and have longer foot-stalks. This continues flowering and producing ripe fruit in the same manner as the other, most part of the year.

These plants are propagated by seeds, which should be sown soon after they are ripe, for if they are kept long out of the ground they seldom grow the same year. They should be sown in pots filled with light earth, and plunged into a moderate hot-bed; and when the plants come up, they should be kept clean from weeds, and gently watered as the earth becomes dry. When the plants are two inches high, they should be each planted in a small halfpenny pot filled with light earth, and plunged into a moderate hot-bed, observing to shade them till they have taken new root; after which they must be treated in the same way as other exotic plants, by admitting fresh air to them daily, according to the warmth of the season, and giving them water as often as they require it. When the plants have obtained strength, they should be removed into the stove, and may be placed on shelves, and there they must constantly remain, for they are too tender to thrive in the open air in England in the warmest part of the year.

The juice of the berries of these plants will stain paper and linen of a bright red colour, and I have made many experiments with it to colour flowers, which have succeeded extremely well; these were made in the following manner. I pressed out the juice of the berries, and mixed it with common water, putting it into a phial, shaking it well together for some time, till the water was thoroughly tinged; then I cut off the flowers which were just fully blown, and placed their stalks into the phial, and in one night the flowers have been finely variegated with red. The flowers which I made the experiments on were the Tuberosa and the double white Narcissus.

PILOSELLA. See HIERACIUM.

PIMPINELLA A. Lin. Gen. Plant. 328. Tragofelinum. Tourn. Inst. R. H. 309. tab. 163. Burnet Saxifrage; in French, *Boicage*.

The CHARACTERS are,

It hath an umbellated flower; the principal umbel is composed of many rays or smaller umbels; neither of these have any involucrum, and the empalements are scarce visible; the greater umbel is uniform. The flowers have five heart-shaped inflexed petals, which are nearly equal, and five stamina which are longer than the petals, terminated by roundish summits. The germen is situated under the flower, supporting two short styles, crowned by obtuse stigmas. The germen afterward becomes an oblong oval fruit, divided in two parts, containing two oblong seeds, plain on the inside and convex on the other, and furrowed.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and two styles.

The SPECIES are.

1. PIMPINELLA (*Major*) foliis pinnatis, foliolis cordatis serratis, summis simplicibus trifidis. Burnet Saxifrage with winged leaves near the root, having heart-shaped sawed lobes, and single three-pointed leaves at the top of the stalk. Tragofelinum majus, umbellâ candidâ. Tourn. Inst. R. H. 309. Greater Burnet Saxifrage with a white umbel.
2. PIMPINELLA (*Saxifraga*) foliis pinnatis, foliolis radicalibus subrotundis, summis linearibus. Lin. Sp. Plant. 263. Burnet Saxifrage with winged leaves, those at the bottom having lobes which are roundish, but those at the top linear. Tragofelinum alterum majus. Tourn. Inst. R. H. 309. Another greater Burnet Saxifrage.
3. PIMPINELLA (*Hircina*) foliis pinnatis, foliolis radicalibus pinnatifidis, summis linearibus trifidis. Burnet Saxifrage with winged leaves, whose lobes of the bottom leaves are wing-pointed, and the upper ones linear and trifid. Tragofelinum minus. Tourn. Inst. R. H. Lesser Burnet Saxifrage.
4. PIMPINELLA (*Nigra*) foliis pinnatis hirsutis, foliolis radicalibus cordatis inæqualiter serratis, summis linearibus quinquefidis. Burnet Saxifrage with hairy winged leaves, whose lobes of the bottom leaves are heart-shaped, unequal and sawed, the upper ones linear and five-pointed. Tragofelinum radice nigra Germanicum. Jussieu. Hort. Chelf. Cat. 100. German Burnet Saxifrage with a black root.
5. PIMPINELLA (*Austriaca*) foliis pinnatis lucidis foliolis radicalibus lanceolatis, pinnato serratis, summis linearibus pinnatifidis. Burnet Saxifrage with shining winged leaves, the lobes of whose bottom leaves are spear-shaped and sawed, and the upper ones linear and wing-pointed. Tragofelinum Austriacum maximum, foliis profundissimè incisis. Boerh. Hort. Chelf. Cat. 100. Largest Burnet Saxifrage of Austria, whose leaves are deeply cut.
6. PIMPINELLA (*Peregrina*) foliis radicalibus pinnatis crenatis, summis cuneiformibus incisis. Lin. Sp. Plant. 164. Burnet Saxifrage, whose lower leaves are winged and indented on their edges, and the upper ones wedge-shaped and cut. Apium peregrinum foliis subrotundis. C. B. P. 153. Foreign Parsley with roundish leaves.
7. PIMPINELLA (*Anisum*) foliis radicalibus trifidis incisis. Lin. Sp. Plant. 264. Pimpinell with trifid cut lower leaves. Anisum vulgare. Clus. Hist. 2. p. 202. Common Anise.

The first sort grows naturally in woods, and on the side of banks near hedges in several parts of England, especially upon chalky land. The lower leaves of this sort are wing-shaped, composed of three pair of heart-shaped lobes, and terminated by an odd one; they are sharply sawed on their edges, and sit close to the midrib. The lower lobes which are the largest, are near two inches long, and one and a half broad at their base, and are of a dark green. The stalks are more than a foot high, dividing into four or five branching foot-stalks; the lower part of the stalk is garnished with winged leaves, shaped like those at the bottom, but smaller; those upon the branches are short and trifid; the branches are terminated by

small umbels of white flowers, which are composed of smaller umbels or rays. The flowers have five heart-shaped petals which turn inward, and are succeeded by two narrow, oblong, channelled seeds. It flowers in July, and the seeds ripen in autumn. There is a variety of this with red flowers, which is frequently found among the other, and rises from the same seed. The second sort grows naturally in dry pastures in many parts of England; the lower leaves of this are composed of four pair of lobes, terminated by an odd one; these are roundish; those on the lower part of the leaf are about half an inch long, and the same breadth; they are indented on their edges; the stalks rise near a foot high, sending out three or four slender branches, which are garnished with very narrow leaves. The umbels of flowers are smaller than those of the first, as are also the flowers and seeds. It flowers about the same time.

The third sort grows naturally in dry gravelly pastures in several parts of England; the lower leaves of this sort have five or six pair of lobes terminated by an odd one, which are deeply cut almost to their midrib in form of wings. The stalks are slender, and rise about a foot high, sending out a few small branches, which have a narrow trifid leaf placed at each joint, and are terminated by small umbels of white flowers, composed of several rays standing upon pretty long foot-stalks. The flowers are small, and appear at the same time with the former.

The seeds of the fourth sort were sent me from Paris by Dr. Bernard de Jussieu. The lower leaves of this sort are composed of six or seven pair of lobes terminated by an odd one; these are heart-shaped, almost two inches long, and one and a half broad near their base; they are hairy, and of a pale green. The stalk rises near two feet high, dividing into several branches, which have one narrow five-pointed leaf at each joint, and are terminated with umbels of white flowers like those of the first sort.

The seeds of the fifth sort I gathered in Dr. Boerhaave's private garden near Leyden; the synonyme applied to it was the title he gave me for it, and he told me he had received the seeds of it from Austria. The lower leaves have five pair of lobes terminated by an odd one; these are placed at a wider distance from each other than those of the other sorts; they are near two inches long, and three quarters of an inch broad in the middle, drawing to a point at each end, and are deeply cut in regular jags opposite, in form of a winged leaf; they are of a lucid green, and have long foot-stalks. The stalks rise two feet high, dividing at the top into two or three slender branches, garnished at each joint with one wing-pointed narrow leaf. The umbels of flowers are very like the first.

All these sorts have perennial roots; they are propagated by seeds, which, if sown in the autumn, will more certainly succeed than when they are sown in the spring. When the plants come up, they will require no other culture but to thin them when they are too close, and keep them clean from weeds; the second year they will flower and produce ripe seeds, and the roots will abide some years, and continue to produce flowers and seeds, if they grow in poor land.

The first sort is directed for medicinal use, but the herbwomen either bring the third sort to market for it, or what is worse, substitute Burnet and Meadow Saxifrage in its stead. It enters the pulvis ari compositis; and is esteemed good for the gravel.

The last sort is the common Anise: this is an annual plant, which grows naturally in Egypt, but is cultivated in Malta and Spain, from which countries the seeds are annually brought to England. From these seeds there is a distilled water, and an oil drawn for medicinal use. The pastry-cooks also make great use of these seeds in several of their compositions, to give them an aromatic taste and smell. The lower leaves are divided into three lobes, which are deeply cut on their edges; the stalk rises a foot and a half high, dividing into several slender branches, which are garnished with narrow leaves, cut into three or four nar-

row segments, and are terminated by pretty large loose umbels, composed of many smaller umbels or rays, which stand upon pretty long foot-stalks. The flowers are small, and of a yellowish white; the seeds are oblong and swelling. It flowers in July, and if the season proves warm, the seeds will ripen in autumn.

The seeds of this should be sown the beginning of April upon a warm border, where the plants are to remain; when they come up, they should be thinned, and kept clean from weeds, which is all the culture this plant requires, but is too tender to be cultivated in England for profit.

PINASTER. See PINUS.

PINGUICULA, Butterwort.

This plant is found growing upon bogs in many parts of England, but is never cultivated in gardens, so I shall pass it over with barely mentioning it.

PINUS. Tourn. Inst. R. H. 585. tab. 355. Raii Meth. Plant. 138. Lin. Gen. Plant. 956. The Pine-tree; in French, *Pin*.

The CHARACTERS are,

The male flowers are collected in a scaly conical bunch; they have no petals, but many stamina, which are connected at their base, but divide at the top, terminated by erect summits; these are included in the scales, which supply the want of petals and empalement. The female flowers are collected in a common oval cone, and stand at a distance from the male on the same tree. Under each scale of the cone is produced two flowers, which have no petals, but a small germen supporting an awl-shaped style, crowned by a single stigma. The germen afterward becomes an oblong oval nut, crowned with a wing, included in the rigid scale of the cone.

This genus of plants is ranged in the ninth section of Linnæus's twenty-fourth class, which includes the plants with male and female flowers on the same plant, whose stamina are joined in one body; to this genus he adds the *Larix* and *Abies* of Tournefort.

The SPECIES are,

1. PINUS (*Sylvestris*) foliis geminis primordialibus solitariis glabris. Hort. Cliff. 450. Pine-tree with two leaves in each sheath, but the first leaves are single. Pinus sylvestris. C. B. P. 491. The wild Pine, or Pineaster.
2. PINUS (*Pinea*) foliis geminis primordialibus solitariis ciliatis. Pine-tree with two gray leaves coming out of each sheath, and the first leaves single. Pinus fativa. C. B. P. 490. The cultivated Pine-tree, commonly called the Stone Pine.
3. PINUS (*Rubra*) foliis geminis brevioribus glaucis, conis parvis mucronatis. Pine-tree with two shorter gray leaves proceeding out of each sheath, and small acute-pointed cones. Pinus sylvestris foliis brevibus glaucis, conis parvis albescentibus. Raii Syn. 2. 288. Wild Pine with shorter gray leaves, and small whitish cones, called Scotch Fir or Pine.
4. PINUS (*Tartarica*) foliis geminis brevioribus latiusculis glaucis, conis minimis. Pine-tree with two shorter broad leaves in each sheath which are gray, and the smallest cones, commonly called Tartarian Pine.
5. PINUS (*Montana*) foliis sæpius ternis tenuioribus viridibus, conis pyramidatis, squamis obtusis. Pine with three narrow green leaves often in each sheath, and pyramidal cones with blunt scales. Pinus sylvestris montana altera. C. B. P. 421. Another wild Mountain Pine, called Mugho.
6. PINUS (*Cembro*) foliis quinis lævibus. H. Scan. 32. Lin. Sp. Plant. 1000. Pine-tree with five smooth leaves in each sheath. Pinus sylvestris montana tertia. C. B. P. 491. The third wild Mountain Pine, called Cembro.
7. PINUS (*Maritima*) foliis geminis longioribus glabris, conis longioribus tenuioribusque. Pine-tree with two longer smooth leaves in each sheath, and longer narrower cones. Pinus maritima secunda. Tabern. Icon. 937. The second maritime Pine.
8. PINUS (*Halepensis*) foliis geminis tenuissimis, conis obtusis, ramis patulis. Tab. 208. Pine-tree with two narrow leaves in each sheath, obtuse cones, and spreading branches. Pinus Halepensis, foliis tenuibus lætè viridibus. Rand. Hort. Chelf. Cat. 158. Aleppo Pine with very narrow dark green leaves.

9. PINUS (*Virginiana*) foliis geminis brevioribus, conis vis, squamis acutis. Pine-tree with two shorter leaves in each sheath, and small cones with acute scales. Pinus Virginiana foliis binis brevioribus & crassioribus fetis, minori cono singulis squamarum capitibus aculeo donatis. Pluk. Alm. 297. Virginian Pine with two shorter and thicker leaves in each sheath, and a smaller cone with each scale ending in a prickle, commonly called Jersey Pine.

10. PINUS (*Rigida*) foliis ternis, conis longioribus squamis rigidioribus. Pine-tree with three leaves, and longer cones having rigid scales, commonly called three-leaved Virginian Pine.

11. PINUS (*Tæda*) foliis longioribus tenuioribus ternis, conis maximis laxis. Pine-tree with three longer narrower leaves, and the largest loose cones. Pinus Virginiana tenuifolia tripilis, i.e. ternis plerumque ex uno folliculo fetis strobilis majoribus Pluk. Alm. 297. Virginian Pine-tree with three narrow leaves in each sheath, and larger cones, called the Frankincense-tree.

12. PINUS (*Echinata*) Virginiana prælongis foliis tenuioribus, cono echinato gracili. Pluk. Alm. 297. Virginian Pine with longer and narrower leaves, and a slender prickly cone, called three-leaved Bastard Pine.

13. PINUS (*Strobus*) foliis quinis scabris. Lin. Sp. Plant. 1001. Pine-tree with five rough leaves in each sheath, commonly called Lord Weymouth's Pine.

14. PINUS (*Palustris*) foliis ternis longissimis. Pine-tree with the longest leaves growing by threes out of each sheath. Pinus Americana palustris trifolia, foliis longissimis. Du Hamel. Three-leaved, Marsh, American Pine with the longest leaves.

There are some other species of this genus in America, which have not been sufficiently examined to ascertain their differences; and it is probable some of the European kinds, which are now supposed to be only varieties of the sorts here enumerated, may be distinct species; but as I have had no opportunities of seeing them, so I have omitted them here.

The first sort here enumerated is the Pineaster, or wild Pine, which grows naturally in the mountains in Italy and the south of France, where there are forests of these trees, which, if suffered to stand, grow to a large size; but in Switzerland they are frequently cut into shingles for covering their houses, and also for making pitch; and in the south of France, the young trees are cut for stakes to support their Vines. This grows to a large size; the branches extend on every side to a considerable distance, and while the trees are young, they are fully garnished with leaves, especially where they are not so close as to exclude the air from those within; but as they advance in age, the branches appear naked, and all those which are situated below become unsightly after years, for which reason they have not been much in esteem of late; for as the wood of the Scotch Fir is much preferable to this, and the branches being generally better garnished with leaves, so the latter has been more generally propagated than the former. The branches of this sort grow at a wider distance than those of the Scotch Pine, and are more horizontal; the leaves are much larger, thicker, and longer, and grow strait, have a broad surface on their inside, which has a furrow or channel running longitudinally; they are of a darker green, and their points are obtuse. The cones of this are seven or eight inches long, pyramidal, and have pointed scales; the seeds are oblong, a little flattened on their sides, and have narrow wings on their tops.

The second sort, which is generally called the Stone Pine, is very common in Italy; but I much doubt of the country where it grows naturally, for so far as I have been able to learn, there are none of these trees growing in any part of Italy, but where they have been planted, or where the seeds have scattered from planted trees; and I have frequently received the seeds of a Pine from China, which were taken out of the cones so like those of this sort, as not to be distinguished from them; but these have never grown, either by their being too old, or from their having been taken out of the cones; for if the seeds of Pines are kept in the cones, they will grow at ten or twelve years

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years old; but when they are out of the cones, they seldom grow well after two years, and some sorts do not grow after one year. The leaves of this are not quite so long as those of the former sort, and are of a grayish or sea-green colour; the cones are not more than five inches long, but are very thick, roundish, and end in an obtuse point; the scales of the cones are flat, and the seeds are more than twice the size of those of the former. The kernels of these are frequently served up in deserts to the table during the winter season in Italy, and formerly they were used in medicine here, but of late years the Pistachia nuts have been generally substituted in lieu of them. The wood of this tree is white, not so full of resin as many of the other sorts, so is never cultivated for its wood, but chiefly for the beauty of its leaves and for the nuts, which are much esteemed in the south of France and in Italy. The third sort is generally known here by the title of Scotch Pine, from its growing naturally in the mountains of Scotland, but it is common in most parts of Europe; and Mons. du Hamel of the Royal Academy of Sciences at Paris, mentions his having received cones of this tree from St. Domingo in the West-Indies, so concludes that it grows indifferently in torrid, frozen, and temperate zones. It is by John Bauhin titled, *Pinus sylvestris Genevensis vulgaris*; so that it grows commonly in the mountains near that city, and all through Denmark, Norway, and Sweden. The wood of this tree is the red or yellow deal, which is the most durable of any of the kinds yet known; the leaves of this tree are much shorter than those of the former sorts, and are broader, of a grayish colour, and twisted, growing two out of each sheath; the cones are small, pyramidal, and end in narrow points; they are of a light colour, and the seeds are small.

This sort grows well upon almost every soil; I have planted numbers of the trees upon Peat-pits, where they have made great progress. I have also planted them in clay, where they have succeeded far beyond expectation; and upon sand, gravel, and chalk, they likewise thrive as well; but as they do not grow near so fast upon gravel and sand as upon moist ground, so the wood is much preferable; for those trees which have been cut down upon moist soils, where they have made the greatest progress, when they have been sawn out into boards, have not been valuable, the wood has been white and of a loose texture; whereas those which have grown upon dry gravelly ground, have proved nearly equal to the best foreign deals; and I doubt not but those plantations which of late years have been made of these trees, will, in the next age, not only turn greatly to the advantage of their possessors, but also become a national benefit; therefore this is the sort which I would recommend to be cultivated on barren lands.

The fourth sort grows naturally in Tartary, from whence I received the seeds. This hath a great resemblance to the Scotch Pine, but the leaves are broader, shorter, and their points are more obtuse; they emit a strong balsamic odour when bruised; the cones of this are very small, as are also the seeds, some of which were black, and others white; but whether they are from different trees or the same, I could not learn; for the seeds were taken out of the cones, but in the parcel there was not one entire cone.

The fifth sort grows naturally upon the mountains in Switzerland; this hath very narrow green leaves, which grow sometimes by pairs, and at others there are three coming out of each sheath; these generally stand erect; the cones are of a middle size and pyramidal; the scales are flat, having each a small obtuse rising, but are very compact, till they are opened by the warmth of the sun the second spring. The seeds of this are much less than those of the Pineaster, but larger than those of the Scotch Pine.

The sixth sort grows naturally in Switzerland, and is supposed to be the same as the Siberian, which I greatly doubt; for the cones of this are short and roundish, and the scales are close, whereas those of the Siberian Pine are long and looser; the leaves have

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a near resemblance to each other, so far as I have observed in the specimens; but the plants which have been raised from the Switzerland seeds, have made much greater progress than those from the Siberian seeds, which can scarce be kept alive in England. The leaves are long and narrow, smooth to the touch, of a light green, and five of them come out from the same sheath; the branches are closely garnished with them; the cones are about three inches long, and the scales are pretty close; the seeds are pretty large, and their shells are easily broken.

The seventh sort grows in the maritime parts of Italy and the south of France; this hath long smooth leaves, growing by pairs in each sheath; the cones are very long and slender; the seeds are about the size of those of the Pineaster.

The eighth sort grows naturally near Aleppo, and in several other parts of Syria. This is a tree of middling growth in its native soil, and in England there are none of any large size, for most of the plants which were growing here before the year 1740, were killed by the frost that severe winter; the two largest which I have seen are growing at Goodwood in Sussex, the seat of his Grace the Duke of Richmond; these had been transplanted thither the year before, so had scarce recovered their removal, and had made no shoots that summer, therefore escaped much better than those plants which were in great vigour, most of which were destroyed. This tree branches out on every side near the root; the branches at first grow horizontally, but turn their ends upward; their bark is smooth, and of a dark gray colour. The leaves are long and very narrow, of a dark green, and grow by pairs in each sheath; if they are bruised, they emit a strong resinous odour. The cones come out from the side of the branches; they are not much more than half the length of those of the Pineaster, but are full as large at their base; the scales are flattened, and the point of the cone obtuse. The seeds are much less than those of the Pineaster, but of the same shape.

The ninth sort grows naturally in most parts of North America; this never rises to any great height, and is the least esteemed in the country of all the sorts. While the plants are young, they make a pretty good appearance; but when they get to the height of seven or eight feet, they become ragged and unsightly, so are not worth cultivating.

The tenth sort grows naturally in Virginia, and other parts of North America, where it rises to a great height; and so far as we can judge by the growth of those trees which are now here, it seems likely to become a large tree in England. There are many of them now growing in the noble plantation of evergreen trees in his Grace the Duke of Bedford's park at Wooburn, which are twenty feet high, though not of many years standing, and keep pace with the other kinds of Pines and Firs in the same plantation. The leaves of this are long, three generally standing in each sheath; the cones of this sort come out in clusters round the branches; they are as long as the cones of the Pineaster, and have rigid scales; the seeds are winged, and nearly as large as those of the Pineaster. The eleventh sort grows naturally in North America; this hath very long narrow leaves, growing by threes out of each sheath; the cones are as large as those of the Stone Pine, but the scales are looser, and the cones more pointed. The scales of this open horizontally, and discharge the seeds. This sort was sent over from America to Mr. Ball of Exeter, and also to Dr. Compton Bishop of London, by the title of Frankincense Pine.

The twelfth sort grows naturally in Virginia; the cones of this have been brought to England of late years, by the title of Bastard three-leaved Pine. The leaves of this sort are long and narrow; sometimes there are three growing in each sheath, and at others but two; the cones are long, slender, and their scales terminate in sharp points; they are rather longer than those of the Pineaster, and not so thick.

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The thirteenth sort grows naturally in most parts of North America, where it is called the white Pine. It is one of the tallest trees of all the species, often growing a hundred feet high in those countries, as I have been credibly informed; the bark of this tree is very smooth and delicate, especially when young; the leaves are long and slender, five growing out of each sheath; the branches are pretty closely garnished with them, so make a fine appearance; the cones are long, slender, and very loose, opening with the first warmth of the spring, so that if they are not gathered in winter, the scales open and let out the seeds. The wood of this sort is esteemed for making masts for ships; it is in England titled Lord Weymouth's, or New England Pine. As the wood of this tree was generally thought of great service to the navy, there was a law made in the ninth year of Queen Anne for the preservation of the trees, and to encourage their growth in America; and it is within forty years past these trees began to be propagated in England in any plenty, though there were some large trees of this sort growing in two or three places long before, particularly at Lord Weymouth's, and Sir Wyndham Knatchbull's in Kent; and it has been chiefly from the seeds of the latter, that the much greater number of these trees now in England have been raised; for although there has annually been some of the seeds brought from America, yet these have been few in comparison to the produce of the trees in Kent; and many of the trees which have been raised from the seeds of those trees, now produce plenty of good seeds, particularly those in the gardens of his late Grace the Duke of Argyle at Whitton, which annually produce large quantities of cones, which his Grace did most generously distribute to all the curious.

This sort and the Scotch Pine, are the best worth cultivating of all the kinds for the sake of their wood; the others may be planted for variety in parks, &c. where they make a good appearance in winter, when other trees are destitute of leaves.

All the sorts of Pines are propagated by seeds, which are produced in hard woody cones; the way to get out their seeds is to lay the cones before a gentle fire, which will cause the cells to open, and then the seeds may be easily taken out. If the cones are kept entire, the seeds will remain good for some years; so that the surest way to preserve them, is to let them remain in the cones until the time for sowing the seeds; if the cones are kept in a warm place in summer, they will open, and emit the seeds; but if they are not exposed to much heat, they will remain entire some years, especially those which are close and compact; and the seeds which have been taken out of Cones of seven years old, have grown very well, so that these may be transported to any distance, provided the cones are well ripened and properly put up.

The best time for sowing the seeds of Pines is about the end of March, and when the seeds are sown, the place should be covered with nets to keep off birds, otherwise, when the plants begin to appear with the husk of the seed on their tops, the birds will pick off the heads of the plants and destroy them.

Where the quantity of seeds to be sown is not great, it will be a good way to sow them either in boxes or pots, filled with light loamy earth, which may be removed from one situation to another, according to the season of the year; but if there is a large quantity of the seeds, so as to require a good space to receive them, they should be sown on an East or North-east border, where they may be screened from the sun, whose heat is very injurious to these plants at their first appearance above ground. Those seeds which are sown in pots or boxes, should also be placed in a shady situation, but not under trees; and if they are screened from the sun with mats at the time when the plants first come up, it will be a good method to preserve them.

Most of the sorts will come up in about six or seven weeks after they are sown, but the seeds of the Stone or cultivated Pine, and two or three of the others,

whose shells are very hard, frequently lie in the ground a whole year; so that when the plants do not come up the first year, the ground should not be disturbed, but kept clean from weeds, and the following spring the plants will rise. This frequently happens in dry seasons, and when they are sown in places a little too much exposed to the sun. Therefore the surest method is, to soak the seeds in water twenty-four hours before they are sown.

When the plants appear, they must be constantly kept clean from weeds; and in very dry seasons, if they are now and then gently refreshed with water, it will forward their growth; but this must be done with great care and caution, for if they are hastily watered, it will wash the tender plants out of the ground, or lay them down flat, which often rots their stalks; and when this is too often repeated, it will have the same effect; so that unless it is judiciously performed, it will be the best way to give them none, but only screen them from the sun.

If the plants come up too close, it will be a good method to thin them gently about the beginning of July. The plants which are drawn up may then be planted on other beds which should be prepared ready to receive them, for they should be immediately planted as they are drawn up, because their tender roots are soon dried and spoiled at this season of the year. This work should be done (if possible) in cloudy or rainy weather, and then the plants will draw out with better roots, and will soon put out new fibres again; but if the weather should prove clear and dry, the plants should be shaded every day from the sun with mats, and now and then gently refreshed with water. In drawing up the plants, there should be great care taken not to disturb the roots of the plants left remaining in the seed-beds, &c. so that if the ground be hard, the beds should be well watered some time before the plants are thinned, to soften and loosen the earth; and if after the plants are drawn out, the beds are again gently watered to settle the earth to the roots of the remaining plants, it will be of great service to them, but it must be done with great care, so as not to wash out their roots, or lay down the plants. The distance which should be allowed these plants in the new beds, is four or five inches row from row, and three inches in the rows.

In these beds the plants may remain till the spring twelve months after, by which time they will be fit to transplant where they are to remain for good, for the younger the plants are when planted out, the better they will succeed; for although some sorts will bear transplanting at a much greater age, yet young plants planted at the same time will in a few years overtake the large ones, and soon outstrip them in their growth; and there is an advantage in planting young, by saving the expence of staking, and much watering, which large plants require. I have several times seen plantations of several sorts of Pines, which were made of plants six or seven feet high, and at the same time others of one foot high planted between them, which in ten years were better trees than the old ones, and much more vigorous in their growth; but if the ground where they are designed to remain cannot be prepared by the time before-mentioned, the plants should be planted out of the beds into a nursery, where they may remain two years, but not longer; for it will be very hazardous removing these trees at a greater age.

The best season to transplant all the sorts of Pines is about the latter end of March or the beginning of April, just before they begin to shoot; for although the Scotch Pine, and some of the most hardy sorts, may be transplanted in winter, especially when they are growing in strong land, where they may be taken with balls of earth to their roots; yet this is what I would not advise for common practice, having frequently seen it attended with bad consequences, but those which are removed in the spring rarely fail.

Where these trees are planted in exposed situations, they should be put pretty close together, that they may

shelter each other; and when they have grown a few years, part of the plants may be cut down to give room for the others to grow; but this must be gradually performed, lest by too much opening the plantation at once, the air should be let in among the remaining trees with too great violence, which will stop their growth.

Although these Evergreen-trees are by many persons despised on account of their dark green in summer, yet a proper mixture of these in large clumps make a fine appearance about a seat in winter, and in summer, by their contrast with other trees, have no bad effect in diversifying the scene.

Wherever large plantations are designed to be made, the best method will be to raise the plants either upon a part of the same land, or as near to the place as possible, and also upon the same sort of soil: a small piece of ground will be sufficient to raise plants enough for many acres, but, as the plants require some care in their first raising, if the neighbouring cottagers, who have many of them small inclosures adjoining to their cottages, or where this is wanting, a small inclosure should be made them for the purpose of raising the plants, and they are furnished with the seeds and directions for sowing them, and managing the young plants till they are fit for transplanting, the women and children may be usefully employed in this work; and the proprietors of land agreeing with them to take their plants when raised at a certain price, it would be a great benefit to the poor; and hereby they would be engaged to have a regard for the plantations when made, and prevent their being destroyed. The Scotch Pine, as was before observed, being the hardiest of all the kinds, and the wood of it the most useful, is the sort which best deserves care. This will thrive upon the most barren sands, where scarce any thing else except Heath and Furze will grow; so that there are many thousand acres of such land lying convenient for water carriage, which at present is of little benefit to any body, that might, by plantations of these trees, become good estates to their proprietors, and also a national benefit; and as the legislature have taken this into their consideration, and already passed some laws for the encouraging these plantations, as also for their preservation and security, so it may be hoped that this will be undertaken by the gentlemen who are possessed of such lands in all the different parts of the kingdom with proper spirit; for although they may not expect to receive much profit from these plantations in their own time, yet their successors may with large interest; and the pleasure which these growing trees will afford them, by beautifying the present dreary parts of the country, will in some measure recompense them for their trouble and expence; and by creating employment for the poor, lessen those rates which are now so high in many parts of England as scarce to be borne.

The expence of making these plantations is what most people are afraid of, so would not engage in it; but the greatest of the expence is that of fencing them from the cattle, &c. for the other is trifling, as there will be no necessity for preparing the ground to receive the plants; and the charge of planting an acre of land with these plants will not be more than twenty or thirty shillings where labour is dear, exclusive of the plants, which may be valued at forty shillings more. I have planted many acres of land with these trees, which was covered with Heath and Furze, and have only dug holes between to put in the plants, and afterward laid the Heath or Furze which was cut, upon the surface of the ground about their roots, to prevent the ground drying, and few of the plants have failed. These plants were most of them four years old from seed, nor was there any care taken to clean the ground afterward, but the whole left to shift, and in five or six years the Pines have grown so well as to overpower the Heath and Furze, and destroy it.

The distance which I have generally planted these plants in all large open situations was about four feet, but always irregular, avoiding planting in rows as

much as possible; and in the planting, the great care is not to take up the plants faster than they can be planted, so that some men have been employed in digging up the plants while others were planting. Those who take up the plants must be looked after, to see they do not tear off their roots or wound their bark; and as fast as they are taken up, their roots should be covered to prevent their drying, and put into their new quarters as soon as possible. In planting them, care should be had to make the holes large enough for their roots, as also to loosen and break the clods of earth, and put the finest immediately about their roots, then to settle the earth gently with the foot to the roots of the plant. If these things are duly observed, and a proper season chosen for performing it, there will be very little hazard of their succeeding; but I have seen some plantations made with plants which were brought from a great distance, and had been so closely packed up as to cause a heat, whereby most of the plants within had their leaves changed yellow, and few of them have grown, which has discouraged others from planting, not knowing the true cause of their failure.

After the plantations are made, the only care they require for five or six years will be to secure the plants from cattle, hares, and rabbits; for if these are admitted to them, they will make great destruction in a short time; for if the branches are gnawed by hares or rabbits, it will greatly retard the growth of the plants, if not destroy them.

In about five or six years after planting, the branches of the young trees will have met, and begin to interfere with each other; therefore they will require a little pruning, but this must be done with great caution. The lower tier of branches only should be cut off; this should be performed in September, at which time there will be no danger of the wounds bleeding too much, and the turpentine will harden over the wounds as the season grows cold, so will prevent the wet from penetrating the wounds. These branches should be cut off close to the stem of the plants, and care should be taken in doing this not to break any of the remaining branches of the young trees. This work should be repeated every other year, at each time taking off only the lower tier of branches; for if the plants are much trimmed, it will greatly retard their growth, as it does in general that of all trees; but as these trees never put out any new shoots where they are pruned, so they suffer more from amputation than those which do.

In those parts of France where they have forests of these trees, the proprietors always give the faggots to those, who prune their young trees first, for their labour, so it costs them no money. At the second pruning the proprietor has one-third of the faggots, and the dressers have the other two for their work, and afterward the faggots are equally divided between the workmen and proprietors, but there must be great care taken that they do not cut off more than should be.

In about twelve or fourteen years these will require no more pruning, for their upper branches will kill those below where they have not air; but soon after this, if the plants have made good progress, it may be necessary to thin them; but this should be gradually performed, beginning in the middle of the plantation first, leaving the outside close to screen those within from the cold, so by degrees coming to them at last, whereby those which were first thinned will have had time to get strength, so will not be in danger of suffering from the admission of cold air. When these plantations are thinned, the trees should not be dug up, but their stems cut off close to the ground, for their roots never shoot again, but decay in the earth, so there can no harm arise by leaving them, and hereby the roots of the remaining plants are not injured. The trees which are now cut will be fit for many purposes; those which are strait will make good putlocks for the bricklayers, and serve for scaffolding poles, so that there may be as much made by the sale

sale of these, as will defray the whole expence of the planting, and probably interest for the money into the bargain.

As the upright growth of these trees renders their wood the more valuable, they should be left pretty close together, whereby they will draw each other up, and grow very tall. I have seen some of these trees growing, whose naked stems have been more than seventy feet high, and as strait as a walking-cane, and from one of these trees there were as many boards sawed, as laid the floor of a room near twenty feet square. If these trees are left eight feet asunder each way, it will be sufficient room for their growth; therefore if at the first thinning a fourth part of the trees are taken away, the other may stand twelve or fourteen years longer, by which time they will be of a size for making ladders and standards for scaffolding, and many other purposes; so that from this sale as much may be made, as not only to pay the remaining part of the expence of planting, if any should be wanting in the first, but rent for the land with interest, and the standing trees for the fortunes of younger children. This may be demonstrated by figures, and there has been several examples of late years, where the profits have greatly exceeded what is here mentioned.

The fifth sort is called in Switzerland Torch Pine; the peasants there make use of the wood of this tree instead of torches for burning. This tree grows to a great height in its native soil, and is well furnished with branches. The wood is pretty full of resin, and when first cut is of a reddish colour; this is used by the inhabitants in their buildings.

The sixth sort of Pine makes but slow progress in England, unless upon the summits of the northern mountains, where upon the peaty moors, this and the Siberian Pine are likely to succeed much better than in any other part of Britain, for they naturally grow among snow.

The eighth sort is never a large tree in its native country, and in England it grows more like a shrub than a tree, and is often greatly injured by cold in winter, and by severe frosts sometimes killed, so that this is only kept for the sake of variety in the English gardens.

The ninth and tenth sorts are used indifferently by the inhabitants of North America for their buildings, and the same purposes as the other sorts of Pine.

There are some varieties of these in America, if they are not distinct species. Some of them ripen their cones the first year, but others are two years, and some three before they are ripe; but as these have not been well distinguished by those who reside in that country, and there are few of the sorts so large in England as to produce cones, so their differences can not as yet be ascertained.

The eleventh and twelfth sorts I believe are indifferently called red Pine in North America, where their wood is greatly esteemed; the French at Canada have built a sixty-gun ship entirely of this wood, called the Saint Laurent. I have had had a little of this wood from America, which was very like that of the Scotch Pine, but had rather more resin. It may not be amiss to make trial of some of these sorts in plantations, to see which of them may deserve to be propagated; for in some places where they are growing they thrive very well, but these will not succeed so well on dry land as on moist.

The thirteenth sort is called the white Pine in most parts of North America; of this I believe there are two varieties, if not distinct species; but as they have not been well examined by persons of skill, we cannot take upon us to determine this, for Monsieur Gaultier's description of one species is very different from that of the Weymouth Pine, and yet he has applied the title of white Pine to both.

This sort deserves to be propagated for its beauty, which is superior to all the sorts of Pines yet known in England. The bark of the young trees and the branches are perfectly smooth; the branches are well

garnished with leaves, which are long, and of an agreeable green, so that in summer they have a beauty, and in winter they make a better appearance than any of the sorts. The wood of this tree is very useful, especially for masts of ships, as the trees grow very tall and strait, and are pliable, so do not break with the wind, therefore the legislature thought proper to pass a law for the preservation and increase of these trees in America; but as these trees will thrive in England, they may be propagated in many places where the soil is proper for them. This sort grows best upon a moist light soil, but it should not be too wet; it will also thrive on a loamy soil, if it is not too much approaching to clay. The seeds of this sort should be sown with a little more care than those of the Scotch Pine, because their stems are not so strong, therefore are more apt to go off while young; so if these are sown in the full ground, the bed should be screened with mats from the sun every day, but exposed to the dews every night. When the plants come up, they should be treated in the same way as is before directed for the Scotch Pine; and if all the plants of this kind are transplanted into beds in July, it will be a secure way to preserve them; but as these plants will grow faster than those of the Scotch Pine, they should be planted farther asunder; their rows should be six inches distant, and in the rows they should be four inches apart. This will allow them room to grow till the spring twelvemonth following, when they may be either transplanted where they are to remain, or into a nursery, where they may stand two years to get strength; but the sooner they are planted where they are to stand, the less danger there will be of their succeeding, and the larger they will grow; for although they will bear transplanting at a greater age, yet when they are planted young, they will make much greater progress, and grow to a greater size.

The soil in which this sort of tree thrives best is a soft hazel loam, not too wet, in which I have frequently measured shoots of one year, which were two feet and a half long, and have for some years continued growing so much: they should have a sheltered situation, for I have observed where the trees have been much exposed to the South-west winds, they have not made near so great a progress as those which grew in shelter; and where there have been plantations of these trees, those on the outside have not kept pace with the middle, nor have their leaves retained their verdure so well.

The fourteenth sort grows naturally on swamps in many parts of North America, where I have been informed they grow to the height of twenty-five or thirty feet. Their leaves are a foot or more in length, growing in tufts at the end of the branches, so have a singular appearance, but I have not heard the wood was of any use but for fuel; and there are few places here where these plants do well, for in very severe frosts their leading shoots are often killed, and in dry ground they will not thrive; so that unless the soil is adapted for them, it is to little purpose planting them.

From the wild Pine or Pineaster is procured the common turpentine, which is chiefly used by the farriers, and from it is distilled the oil of turpentine. The finer and more valuable part, which comes first, is called the spirit, what is left at the bottom of the still is the common resin.

The kernels of the nuts of the manured or Stone Pine are of a balsamic nourishing nature, good for consumptions, coughs, and hoarseness, restorative, and of service after long illness.

PIPER. Lin. Gen. Plant. 42. Saururus. Plum. Nov. Gen. 51. tab. 12. Pepper, or Lizard's-tail.

The CHARACTERS are,

The flowers are closely fastened to a single stalk, and have no compleat sheath; these have no petals nor stamina, but have two summits opposite to the root of the germen, which are roundish; they have a large oval germen, but no style, crowned by a prickly triple stigma. The germen afterward

afterward becomes a roundish berry with one cell, containing one globular seed.

This genus of plants is ranged in the third section of Linnæus's second class, which includes those plants whose flowers have two male, and three female parts of generation.

The SPECIES are,

1. PIPER (*Obtusifolium*) foliis obovatis enerviis. Lin. Sp. Plant. 30. *Pepper with obverse oval leaves having no veins.* Saururus humilis, folio carnosio, subrotundo. Plum. Cat. 51. *Low Lizard's-tail with a fleshy roundish leaf.*
2. PIPER (*Pelucidum*) foliis cordatis petiolatis, caule herbaceo. Lin. Sp. Plant. 30. *Pepper with heart-shaped leaves having foot-stalks, and an herbaceous stalk.* Piper foliis cordatis, caule procumbente. Hort. Cliff. 6. tab. 4. *Pepper with heart-shaped leaves and a trailing stalk.*
3. PIPER (*Amalago*) folis lanceolato-ovatis quinquenerviis rugosis. Lin. Sp. Plant. 29. *Pepper with rough, oval, spear-shaped leaves having five veins.* Saururus foliis lanceolato-ovatis quinquenerviis rugosis. Hort. Cliff. 140. *Lizard's-tail with rough, spear-shaped, oval leaves, having five veins.*
4. PIPER (*Humilis*) foliis lanceolatis nervosis rigidis sessilibus. *Pepper with stiff, spear-shaped, veined leaves sitting close to the branches.* Piper longum humilium, fructu à summitate caulis prodeunte. Sloan. Cat. Jam. 45. *Dwarf long Pepper, with the fruit coming out at the end of the stalk.*
5. PIPER (*Peltatum*) foliis peltatis orbiculato-cordatis obtusis repandis, spicis umbellatis. Lin. Sp. Plant. 30. *Pepper with target-formed leaves which are orbicular, heart-shaped, obtuse, recurved, and have spikes growing in umbels.* Saururus arborefcens, foliis amplis, rotundis & umbilicatis. Plum. Cat. 51. *Tree Lizard's-tail with large, round, navel-shaped leaves.*
6. PIPER (*Laurifolia*) foliis lanceolato-ovatis nervosis, spicis brevibus. *Pepper with spear-shaped, oval, veined leaves, and short spikes.* Saururus frutescens, laurocerasi folio, fructu brevior & crassior. Houft. MSS. *Shrubby Lizard's-tail with a Laurel leaf, and a shorter thicker fruit.*
7. PIPER (*Tomentosum*) foliis ovato-lanceolatis tomentosis, caule arborefcente. *Pepper with oval, spear-shaped, woolly leaves, and a tree-like stalk.* Saururus arborefcens latifolia, villosa fructu gracili. Houft. MSS. *Broad-leaved, tree-like, hairy Lizard's-tail, with a slender fruit.*
8. PIPER (*Aduncum*) foliis ovato-lanceolatis, nervis alternis, spicis uncinatis. Lin. Sp. Plant. 29. *Pepper with oval spear-shaped leaves, having alternate veins and crooked spikes.* Saururus arborefcens fructu adunco. Plum. Cat. 51. *Lizard's-tail with a crooked fruit.*
9. PIPER (*Decumanum*) foliis cordato-ovatis nervosis acuminatis, spicis reflexis. *Pepper with oval, heart-shaped, nerved, acute-pointed leaves, and reflexed spikes.* Saururus frutescens plantaginis folio ampliore, fructu brevior & gracilior adunco. Houft. MSS. *Shrubby Lizard's-tail with a larger Plantain leaf, and a shorter and slenderer crooked spike.*
10. PIPER (*Siriboa*) foliis cordatis subseptinerviis venosis. Flor. Zeyl. 29. *Pepper with heart-shaped leaves which are veined, and have almost seven nerves.*
11. PIPER (*Reticulatum*) foliis cordatis septemnerviis reticulatis. Lin. Sp. Plant. 29. *Pepper with heart-shaped netted leaves having seven veins.* Saururus botryoides major, foliis plantaginis. Plum. Cat. 51. *Greater Lizard's-tail with Plantain leaves.*
12. PIPER (*Glabrum*) foliis ovato-lanceolatis acuminatis glabris trinerviis. *Pepper with oval, spear-shaped, acute-pointed, smooth leaves, having three veins.* Saururus racemosus, seu botryides minor. Plum. Cat. 51. *Small branching, or clustered Lizard's-tail.*
13. PIPER (*Racemosum*) foliis lanceolato-ovatis rugosis, nervis alternis. *Pepper with spear-shaped, oval, rough leaves, having alternate veins.* Saururus racemosus, seu botryites major. Plum. Cat. 51. *Greater branching, or clustered Lizard's-tail.*

The first sort grows naturally in many of the islands in the West Indies. This sends out from the root

many succulent herbaceous stalks almost as large as a man's little finger; they are jointed, and divide into many branches, never rising above a foot high, but generally spread near the ground, putting out roots at each joint, so propagate very fast, and soon cover a large space of ground. The leaves are very thick and succulent; they are about three inches long and two broad, very smooth and entire. The foot-stalk, which sustains the spike or tail, comes out at the end of the branches; this is also very succulent, and the whole length, including the spike, is about seven inches. The spike is strait, erect, and about the size of a goose-quill, closely covered with small flowers which require a glass to be distinguished, so have no beauty; but the whole spike much resembles the tail of a lizard, for which Plumier gave it that title.

These spikes appear great part of the year, but they rarely have any seeds in England; the plants increase very fast by their stalks, which put out roots. It requires a warm stove to preserve it in England, and should have but little wet, especially in winter. If the plants are plunged into the tan-bed in the stove, the stalks will put out roots into the tan, so may be cut off to make new plants.

The second sort grows naturally in the West-Indies; this is annual. The stalks are herbaceous and succulent; they rise about seven or eight inches high; the leaves are heart-shaped, an inch and a half long, and three quarters of an inch broad; the spikes of flowers come out at the end of the stalks; they are slender, about an inch long, and strait; the flowers are very small, and sit close to the foot-stalk. These appear in July, and are succeeded by very small berries, each containing a small seed like dust. If these seeds are permitted to scatter on the pots near it, the plants will come up without trouble; or if the seeds are sowed, and sown upon a hot-bed in the spring, the plants will rise easily. These should be transplanted into separate pots, and plunged into a hot-bed of tanners bark, treating them in the same way as other tender plants, but they should not have much wet.

The third sort grows naturally in Jamaica and Barbadoes. This hath several crooked stems, which rise to the height of twelve or fourteen feet, which are jointed, hollow, and pithy; these divide into many small branches, which are garnished with spear-shaped oval leaves about three inches and a half long, and one and a half broad; they are rough, and have five longitudinal veins. The spikes come out at the end of the branches; they are slender, and about three inches long; these have many small flowers sitting close to the foot-stalk, which are succeeded by small berries.

The fourth sort grows naturally in Jamaica. The stalks of this are slender, and frequently trail upon the ground, putting roots out from their joints like the first; they are garnished with stiff spear-shaped leaves five inches long, and two broad in the middle, drawing to a point at each end; they have one strong midrib, and on the backside have several veins running from that to the sides. The spike of flowers is very slender, and about five inches long, shaped like those of the former sorts.

The fifth sort grows naturally in Jamaica; this hath a pretty thick spongy stalk which rises fifteen feet high, dividing into several branches which are jointed, and pithy; the leaves are almost round; the foot-stalk is fastened to the under side, so that the upper surface has a mark like a navel where the stalk joins, and from that center run out the veins to the side. The leaves are about a foot diameter; their lower part is indented like a heart, but the other part is round, and the stalk being fixed toward the middle, the leaves have the appearance of a target. The spikes are small, and grow in form of an umbel.

The sixth sort grows naturally at La Vera Cruz in America. This hath shrubby jointed stalks which rise nine or ten feet high, dividing into smaller branches, which are garnished with spear-shaped oval leaves seven inches long, and three broad, ending

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in acute points; they are veined and rough, of the same consistence with Laurel leaves. The spikes of flowers come out from the side of the branch at the joints, opposite to the leaves; they are not more than one inch and a half long, about the thickness of a small quill, and are closely set with flowers like the other sorts.

The seventh sort was discovered by the late Dr. Houstoun growing naturally at La Vera Cruz. This hath hollow pithy stalks, which rise twelve or fourteen feet high, dividing into many crooked branches having swelling joints, which are garnished with oval spear-shaped leaves, about five inches long and three broad, having many veins, and are covered with a woolly down. The spikes of flowers come out from the side of the branches opposite to the leaves; they are slender, and about three inches long, turning downward.

The eighth sort grows naturally in Jamaica; this hath many hollow stalks, which rise about five feet high; the joints are pretty close and protuberant; these divide into smaller branches, which are garnished with oval spear-shaped leaves, seven inches long and three broad in the middle; they are rough and veined, the veins coming out alternately from the midrib, diverging to the sides, and join the borders of the leaf at the top. The spikes of flowers come out from the side of the branches, opposite to the leaves; they are slender, five inches long, and are incurved; these are closely set with small flowers their whole length. This is called Spanish Elder in the West-Indies.

The ninth sort was sent me from Carthage by the late Dr. William Houstoun; this rises with several shrubby stalks fifteen feet high, dividing into many slender branches with protuberant joints, which are garnished with heart-shaped oval leaves, five inches long and three broad, ending in acute points; they are smooth, and at their base have five veins, but the two outer join the borders of the leaves soon; the other three run to the top, the middle one in a right line; the two side veins diverge, and join together at the top; the leaves are of a dark green on their upper side, but pale on their under. The spikes of flowers come out from the side of the branches; they are extremely slender, an inch and a half long, and are reflexed at the end like a scorpion's tail.

The tenth sort was sent me by Mr. Robert Millar from Panama, near which place it grows naturally. This hath hollow shrubby stalks which rise about four feet high, and divide into many small branches, which are garnished with heart-shaped leaves about five inches long, and four broad near their base, ending in long acute points; these have seven veins at their base, but the two outer soon diverge to the borders of the leaves, and unite with them; the other five are extended almost to the length of the leaves, diverging from the midrib toward the sides, and unite toward the top. The spikes come out from the side of the branches; they are slender, and about four inches long, bending in the middle like a bow, and are closely set with small herbaceous flowers, which are succeeded by small berries, inclosing a small single seed.

The eleventh sort grows naturally in Jamaica; this rises with a shrubby pithy stalk about five feet high, sending out several side branches which have protuberant joints, and are garnished with heart-shaped leaves six inches long and five broad near their base. They have five veins which arise from the foot-stalk, the middle one going in a direct line to the point; the two side veins diverge toward the edges of the leaves in the middle, but approach again at the top; the surface of the leaves is full of small veins, which form a sort of net-work. The spikes come out from the side of the branches opposite to the leaves; they are slender, and about five inches long, a little bending in the middle, and are closely set with very small herbaceous flowers.

The twelfth sort grows naturally at Campeachy, from whence it was sent me by the late Dr. Houstoun.

P I S

This hath many shrubby stalks which rise about ten feet high, and divide into several crooked branches toward the top, which have swelling joints, and are garnished with oval spear-shaped leaves near four inches long, and two and a half broad, terminating in acute points; they are smooth, of a lucid green, and have three large veins running longitudinally; the middle or midrib being strait, the two outer diverging toward the sides in the middle of the leaf, but are drawn together again at the point. The spikes come out from the side of the stalks opposite to the leaves; they are pretty long, slender, and a little incurved. The flowers and seeds are like the other species.

The thirteenth sort grows naturally at Campeachy; this hath a shrubby stalk, which rises ten or twelve feet high, dividing toward the top into a great number of small branches, which are hollow, and have protuberant joints; they are garnished with spear-shaped, oval, rough leaves, about five inches long, and two inches and a half broad; some of them have long, and others very short foot-stalks; they are of a deep green on their upper side, but pale on their under, ending in acute points. The spikes come out from the side of the stalks, opposite to the leaves; they are long and slender, and are closely set with very small flowers like the other species.

The eleven last-mentioned sorts are abiding plants, which require a warm stove to preserve them in England. They may be propagated by seeds, if they can be procured fresh from the countries where the plants grow naturally; these should be sown upon a good hot-bed in the spring, and when the plants come up and are fit to transplant, they should be each put into a separate small pot filled with light fresh earth, and plunged into a hot-bed of tanners bark, shading them every day from the sun till they have taken fresh root; then they must be treated in the same way as other tender exotic plants, admitting fresh air to them daily in proportion to the warmth of the season, to prevent their drawing up weak; and when the nights are cold, the glasses of the hot-bed should be covered with mats to keep them warm. As the stalks of most of these plants are tender when young, so they should not have much wet, which would rot them; and when water is given to them it must be with caution, not to beat down the plants; for when that is done, they seldom rise again.

In autumn the plants must be plunged into the tan-bed of the bark-stove, and during the winter they must be sparingly watered; they require the same warmth as the Coffee-tree. In the summer they require a large share of fresh air in hot weather, but they must be constantly kept in the stove, for they are too tender to bear the inclemency of our weather in summer.

PISCIDIA. Lin. Gen. 856. Piscipula. Loeß. It. 275.

The CHARACTERS are,

The flower is of the butterfly kind; the empalement is of one leaf, indented in five parts; the standard is rising, and indented at the end; the wings are as long as the standard, the keel is moon-shaped and rising. It hath ten stamina covered with a sheath at bottom, which opens at the top; these are terminated by oblong summits: the germen is linear and compressed, supporting a narrow rising style crowned by a pointed stigma. This becomes a narrow pod, having four longitudinal borders with one cell, and between each isthmus have one cylindrical seed.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, intitled Diadelphia Decandria, the flowers having ten stamina in two bodies.

The SPECIES are,

1. PISCIDIA (*Erythrina*) foliolis ovatis. Jacq. Amer. 27. *Piscidia with oval leaves.* Coral arbor polyphylla, non spinosa, fraxini folio, siliquis alis foliaceis extantibus rotæ molendinaria fluviatilis acuta. Sloan. Hist. 2. p. 39. *Dogwood-tree.*
2. PISCIDIA (*Carthaginensis*) foliolis obovatis. Jacq. Amer. 27. *Piscidia with oblong oval leaves.* Phaseolis accedens Coral arbor polyphyllus, foliis durioribus

non spinosa. Pluk. Alm. 293. tab. 214. f. 4. Dog-wood-tree with oblong oval leaves.

The first sort grows plentifully in Jamaica, where it rises with a stem to the height of twenty-five feet or more, which is almost as large as a man's body, covered with a light coloured smooth bark, and sending out several branches at the top without order; these are garnished with winged leaves, whose pinnæ or lobes are oval; there are generally seven in each leaf; these are about two inches long, and one and a half broad, placed for the most part opposite, and terminated by an odd lobe; the flowers are of the butterfly kind, of a dirty white colour, and are succeeded by oblong pods, which have four longitudinal wings, and are jointed between the cells which contain the seeds.

The negroes in the West-Indies make use of the bark of this tree to catch fish, which, if thrown into the water will intoxicate the fish, and cause them to rise to the surface of the water, and turn upon their backs, so are easily caught; but this intoxication is not of long continuance, nor has it been known to give any bad quality to the fish.

The second sort is also a native of the West-Indies; it differs from the first in the shape and consistence of the leaves, which are more oblong, and of a firmer texture than those of the first, but in other respects they are very similar.

Both sorts are easily propagated by seeds, when they can be obtained fresh from the countries where they naturally grow, for in Europe these plants do rarely flower; there are plants now in the Chelsea Garden which are more than twenty years old, and if they had not been two or three times shortened, would have been more than twenty-five feet high, yet have not attempted to flower though they are in perfect health. The seeds must be sown upon a good hot-bed in the spring, and when the plants come up and are fit to transplant, they should be each planted in a small pot filled with light earth, and plunged into a hot-bed of tanners bark, and afterward treated in the same way as hath been directed for the ERYTHRINA, to which article the reader is desired to turn, to avoid repetition.

PISONIA. Plum. Nov. Gen. 7. tab. 11. Lin. Gen. Plant. 984. Fingrigo, vulgò.

The CHARACTERS are,

The male flowers grow upon different plants from the fruit. The male flowers have a small erect empalement, cut into five acute points. The flowers are funnel-shaped, the tube is short; the brim is expanded, and cut into five acute parts; they have five awl-shaped stamina which are longer than the petal, terminated by obtuse summits. The female flowers have empalements like the male, and the flowers are of the same form; they sit upon the germen, which is situated under the receptacle, supporting a cylindrical style longer than the petal, crowned by five oblong spreading stigmas. The germen afterward turns to an oval capsule having five angles and one cell, containing one smooth, oblong, oval seed.

This genus of plants is ranged in the fifth section of Linnæus's twenty-second class, which includes those plants whose male and female flowers are upon different plants, and the female flowers have five stigmas or styles.

We have but one SPECIES at present in England, viz.

PISONIA (*Aculeata*) spinis axillaribus patentissimis. Lin. Sp. Plant. 1511. *Prickly Pisonia, called Fingrigo in the West-Indies.* Pisonia aculeata, fructu glutinoso & racemoso. Plum. Nov. Gen. 7. *Prickly Pisonia with a glutinous branching fruit.*

The title of this genus was given by Father Plumier, in honour of Dr. William Piso, who published a Natural History of Brasil. The name of Fingrigo is what the inhabitants of Jamaica know it by.

The male plants differ so much in appearance from the female, that those who have not seen them rise from the same seeds, would suppose they were

different species, I shall therefore give short descriptions of each.

The male plants have stalks as thick as a man's arm, which rise ten or twelve feet high; the bark is of a dark brown colour, and smooth; these send out many branches by pairs opposite, which are much stronger than those of the female, so do not hang about so loose. They are garnished with obverse, oval, stiff leaves, an inch and a half long, and an inch and a quarter broad, standing opposite on short foot-stalks. From the side of the branches come out short cursons or spurs, like those of the Pear-tree, having each two pair of small leaves at bottom, and from the top comes out the foot-stalk of the flowers which is slender, about half an inch long, dividing at the top into three; each of these sustain a small corymbus of herbaceous yellow flowers, each having five stamina standing out beyond the petal, terminated by obtuse summits.

The stalks of the female plants are not so strong as those of the male, so require support. These rise eighteen or twenty feet high, sending out slender weak branches opposite, which are armed with short, strong, hooked spines, and garnished with small oval leaves, about an inch and three quarters broad; these stand opposite on the larger branches, but on the smaller they are alternate, and have short foot-stalks. The flowers are produced in small bunches at the end of the branches, sitting upon the germen; they are shaped like those of the male, but have no stamina; in the center is situated a cylindrical style, crowned by five spreading stigmas. The germen afterward turns to a channelled, five-cornered, glutinous capsule, armed with small crooked spines, each containing one oblong, oval, smooth seed.

These plants are very common in the savannas, and other low places in the island of Jamaica, as also in several other islands in the West-Indies, where it is very troublesome to whoever passes through the places of their growth, fastening themselves by their strong crooked thorns to the clothes of the persons; and their seeds being glutinous and burry, also fasten themselves to whatever touches them; so that the wings of the ground-doves and other birds, are often so loaded with the seeds, as to prevent their flying, by which means they become an easy prey.

In Europe this plant is preserved in the gardens of some curious persons for variety; it is propagated by seeds, which should be sown in pots filled with light rich earth, and plunged into a hot-bed of tanners bark; and when the plants come up, they should be transplanted into separate pots, and plunged into the hot-bed again, where they may remain till Michaelmas, when they should be removed into the stove, and plunged into the bark-bed, and treated in the same manner as hath been directed for several tender plants of the same country; observing in hot weather to give them plenty of water, but in winter they should have it more sparingly. They are too tender to thrive in the open air of this country at any season of the year, wherefore they should be constantly kept in the stove. They retain their leaves most part of the year in England.

PISTACIA. Lin. Gen. Plant. 982. Terebinthus. Tourn. Inst. R. H. 579. tab. 345. Lentiscus. Tourn. Inst. R. H. 580. Turpentine-tree, Pistachia-nut, and Mastick-tree.

The CHARACTERS are,

The male and female flowers grow upon separate trees; the male flowers are disposed in loose sparsed katkins, having small scales with one flower; these have small five-pointed empalements, but no petals; they have five small stamina, terminated by oval, four-cornered, erect summits. The female flowers have small trifid empalements, but no petals; they have each a large oval germen, supporting three reflexed styles, crowned by thick prickly stigmas. The germen afterward turns to a dry berry or nut, inclosing an oval smooth seed.

This genus of plants is ranged in the third section of Linnæus's twenty-second class, which includes those plants

plants which have male and female flowers on separate plants, whose female flowers have three styles.

The SPECIES are,

1. PISTACIA (*Terebinthus*) foliis impari pinnatis, foliolis subovato recurvis. Lin. Mat. Med. 454. Sp. Plant. 145. *Pistachia with unequal winged leaves, whose lobes are somewhat oval and recurved.* Terebinthus Indica Theophrasti pistacia Dioscoridis. Adv. 413. *The Pistachia-tree.*
2. PISTACIA (*Trifolia*) foliis subternatis. Hort. Cliff. 456. *Pistacia with trifoliate leaves.* Terebinthus, seu pistacia trifolia. Tourn. Inst. 580. *Three-leaved Turpentine, or Pistachia-tree.*
3. PISTACIA (*Narbonensis*) foliis pinnatis ternatisque, suborbiculatis. Lin. Sp. Plant. 1025. *Pistachia with winged and trifoliate leaves, which are almost round.* Terebinthus peregrina, fructu majore, pistaciis simili, eduli. C. B. P. 400. Tourn. Inst. 579. *Foreign Turpentine-tree, with a large eatable fruit like Pistachia.*
4. PISTACIA (*Vera*) foliis impari pinnatis, foliolis ovato-lanceolatis. Hort. Cliff. 456. *Pistachia with unequal winged leaves, whose lobes are oval and spear-shaped.* Terebinthus vulgaris. C. B. P. 400. *The common Turpentine-tree.*
5. PISTACIA (*Lentiscus*) foliis abruptè pinnatis, foliolis lanceolatis. Hort. Cliff. 456. *Pistachia with abrupt winged leaves, and narrow spear-shaped lobes.* Lentiscus vulgaris. C. B. P. 399. *Common Mastick-tree.*
6. PISTACIA (*Massiliensis*) foliis abruptè pinnatis, foliolis lineari lanceolatis. *Pistachia with abrupt winged leaves, and narrow spear-shaped lobes.* Lentiscus angustifolia Massiliensis. H. R. Par. *Narrow-leaved Mastick-tree of Marseilles.*
7. PISTACIA (*Americana*) foliis impari pinnatis, foliolis lanceolato-ovatis acuminatis. *Pistachia with unequal winged leaves, whose lobes are spear-shaped, oval, and acute-pointed.* Terebinthus pistaciæ fructu non eduli. Plum. Cat. 17. *Turpentine-tree with a fruit like the Pistachia, which is not eatable.*
8. PISTACIA (*Simaruba*) foliis pinnatis deciduis, foliolis oblongo ovatis. *Pistachia with winged deciduous leaves, having oblong oval lobes.* Terebinthus major, betulæ cortice, fructu triangulari. Sloan. Hist. Jam. 2. p. 89. tab. 199. *Greater Turpentine-tree with a bark like the Birch-tree, and a triangular fruit, commonly called Birch-tree in Jamaica.*

The first sort is the Pistachia-nut-tree, whose fruit is much better known in England than the tree. This grows naturally in Arabia, Persia, and Syria, from whence the nuts are generally brought to Europe. In those countries it grows to the height of twenty-five or thirty feet; the bark of the stem and old branches are of a dark russet colour, but that of the young branches is of a light brown; these are garnished with winged leaves, composed sometimes of two, and at others of three pair of lobes, terminated by an odd one; these lobes approach toward an oval shape, and their edges turn backward; if these are bruised, they emit an odour like the shell of the nut. Some of these trees produce male flowers, others have female, and some, when old, have both on the same tree. The male flowers come out from the side of the branches, in loose bunches or katkins; they are of an herbaceous colour, having no petals, but have each five small stamina, crowned by large four-cornered summits filled with farina; when that is discharged, the flowers fall off. The female flowers come out upon different trees in clusters from the side of the branches; these have no petals, but have each a large oval germen, supporting three reflexed styles; these are succeeded by oval nuts. This tree flowers in April, but the fruit never ripens in England. It is propagated by the nuts, which should be planted in pots filled with light kitchen-garden earth, and plunged into a moderate hot-bed to bring up the plants; when these appear, they should have a large share of air admitted to them, to prevent their drawing up weak; and by degrees they must be hardened to bear the open air, to which they should be exposed the beginning of June, and may remain abroad till autumn,

when they should be placed under a hot-bed frame to screen them from the frost in winter; for while they are young, they are too tender to live through the winter in England without protection, but they should always be exposed to the air in mild weather; these plants shed their leaves in autumn, so should not have much wet in winter; and in the spring, before the plants begin to shoot, they must be transplanted each into a separate small pot; and if they are plunged into a very moderate hot-bed, it will forward their putting out new roots; but as soon as they begin to shoot, they must be gradually hardened, and placed abroad again; these plants may be kept in pots three or four years till they have got strength, during which time they should be sheltered in winter; and afterward they may be turned out of the pots, and planted in the full ground, some against high walls to a warm aspect, and others in a sheltered situation, where they will bear the cold of our ordinary winters very well, but in severe frosts they are often destroyed. The trees flower and produce fruit in England, but the summers are not warm enough to ripen the nuts.

The second sort grows naturally in Sicily and the Levant, where it is a tree of a middling size, covered with a rough brown bark, and dividing into many branches, which are garnished with leaves, which for the most part have three, but some have four oval lobes; they stand upon long foot-stalks, and are of a dark green colour. The male flowers grow upon different trees from the female, and are like those of the former sort, but are of a yellowish green colour. The female flowers of this sort I have not seen, so can give no account of them; these are succeeded by fruit like that of the former, but are much smaller. This is propagated by seeds in the same manner as the former, and the plants should be treated in the same way, but require more protection in winter. There were several plants of this kind in the English gardens before the year 1740, which had lived abroad some years against walls, but that severe winter killed most of them.

The third sort grows in Italy and the South of France, but is supposed to have been transplanted there from some other country. This is a tree of a middling size, covered with a light gray bark, sending out many side branches, which are garnished with leaves which have sometimes five, and at others but three roundish lobes, which stand upon pretty long foot-stalks, and are of a light green colour. The male flowers grow upon separate trees from the fruit, as in the other sorts; the fruit of this is small, but eatable. This is propagated by nuts in the same way as the first, and the plants are equally hardy.

The fourth sort grows naturally in Barbary, and also in Spain, Italy, and the Levant. This is a tree of middling size, covered with a brown bark, and dividing into many branches, whose bark is very smooth while young, garnished with winged leaves, composed of three or four pair of oval spear-shaped lobes, terminated by an odd one. The flowers are male and female on different trees, as the former: the male flowers of this have purplish stamina; they appear in April, but I have not seen any of the female trees in flower. This is propagated by seeds, but unless they are sown in autumn soon after they are ripe, they seldom grow the first year, but remain in the ground a whole year; and unless the seeds are taken from such trees as grow near the male, the seeds will not grow, as I have several times experienced.

The plants of this sort may be treated in the same manner as the first, and are as hardy. There is a tree of this sort now growing in the gardens of the Bishop of London at Fulham, against a wall, which was planted there above fifty years ago, and has endured the winters without cover; and some trees of this kind which were planted in the open air, in the garden of his Grace the Duke of Richmond at Goodwood in Suffex, had survived several winters without any protection. From these trees the common turpentine

pentine of the shops was formerly taken, but there is little of that now imported, but that from some of the cone-bearing trees is generally substituted for it.

The fifth sort is the common Maffick-tree, which is better known in the gardens by its Latin title of *Lentiscus*. This grows naturally in Spain, Portugal, and Italy, and being evergreen, the plants have been preserved in the English gardens to adorn the green-house in winter. This in its native countries rises to the height of eighteen or twenty feet, covered with a gray bark, sending out many branches, which have a reddish brown bark, and are garnished with winged leaves, composed of three or four pair of small spear-shaped lobes, without an odd one at the end. The midrib which sustains the lobes, has two narrow borders or wings, running from lobe to lobe; these lobes are of a lucid green on their upper side, but pale on their under. The male flowers come out in loose clusters from the sides of the branches; they are of an herbaceous colour, appearing in May, and soon fall off. These are generally upon different plants from the fruit, which also grows in clusters, and are small berries, of a black colour when ripe.

The plants of this sort are generally propagated by laying down of their young branches, which, if properly managed, will put out roots in one year, and may then be cut off from the old plants, and each transplanted into separate small pots. These must be sheltered in winter, and in summer placed abroad in a sheltered situation, and treated in the same way as other hardy kinds of green-house plants. It may also be propagated by seeds in the same way as the Turpentine-tree; but if the seeds are not taken from trees growing in the neighbourhood of the male, they will not grow; and if they are kept out of the ground till spring, the plants rarely appear till the spring following. When these plants have obtained strength, some of them may be turned out of the pots, and planted against warm walls; where, if their branches are trained against the walls, they will endure the ordinary winters very well, and with a little shelter in severe winters they may be preserved.

The sixth sort grows naturally about Marfeilles, and in some other places in the South of France, where it rises to the same height as the former from which it differs, in having one or two pair of lobes more on each leaf, and the lobes are much narrower, and of a paler colour. This difference holds in the plants which are propagated by seeds, so may be pronounced a distinct species. It is propagated in the same way as the former sort, and is equally hardy.

The seventh sort grows naturally in many of the islands in the West-Indies, where it rises to a middling stature, dividing into many branches, which are covered with a purplish bark, and garnished with winged leaves, composed of two or three pair of spear-shaped, oval, acute-pointed lobes, terminated by an odd one; these are an inch and three quarters long, and near an inch broad, running out in acute points; they are very thin and tender, and have long foot-stalks. The male flowers come out at the end of the branches; they are disposed in a single racemus (or long bunch) about three inches long; they are of a purplish colour, and have yellow summits. The fruit grows upon separate trees from the male flowers; they are shaped like the nuts of *Pistachia*, but are smaller and not eatable. This was sent me by Dr. Cressy from Antigua.

The eighth sort grows naturally in Jamaica, and also in most of the other islands in the West-Indies, where it rises to the height of thirty or forty feet, covered with a loose brown bark, which falls off in large pieces; the stems are large, and divide into many branches toward the top, which are crooked and unlighty; these are garnished with winged leaves, composed of five or six pair of oblong, oval, smooth lobes, about four inches long and two broad, terminated by an odd one. The flowers come out at the end of the branches, in long loose bunches of a yellowish colour; these grow on different trees, or on different parts of the same tree from the fruit, which also hangs in long bunches,

and is about the size of a middling Pea, having a dark skin covering a nut about the size of a common Cherry-stone, and of the same colour.

These two trees are tender, so will not thrive in this country, unless they are kept in a warm stove. They are propagated by seeds, which must be taken from such trees as grow in the neighbourhood of the males, otherwise they will not grow, as I have too often found true. These should be sown in pots filled with light earth, and plunged into a good hot-bed of tanners bark; and when the plants are come up fit to remove, they should be each planted in a separate small pot, and plunged into a fresh hot-bed, treating them in the same way as the other tender plants from the same countries, and in the autumn they should be removed into the stove, plunging the pots into the tan-bed; and during the winter they must have but little water, especially if they cast their leaves, which is generally the case after the first winter; for the young plants generally retain their leaves the whole year, but afterward they are destitute of leaves for two months, in the latter part of the winter. These plants should constantly remain in the stove, but in warm weather they must have a large share of air admitted to them.

PISUM. Tourn. Inst. R. H. 394. tab. 215. Lin. Gen. Plant. 779. [Some are of opinion, that this plant takes its name from the city Pisa, where it anciently grew in plenty; others derive it from *πίσιον*, which comes from *πίσιω*, to fall; because, if this plant be not supported, it will fall to the ground.] Pea; in French, *Pois*.

The CHARACTERS are,

The flower hath a one-leaved permanent empalement cut into five points, the two upper being broadest; it hath four petals, and is of the butterfly kind. The standard is broad, heart-shaped, reflexed, and indented, ending in a point. The two wings are shorter, roundish, and close together; the keel is compressed, moon-shaped, and shorter than the wings. It hath ten stamina in two bodies, the upper single one is plain and awl-shaped, the other nine are cylindrical below the middle, awl-shaped above and cut; these are joined together, and are terminated by roundish summits. It has an oblong compressed germen, with a triangular rising style, crowned by a hairy oblong stigma. The germen afterward becomes a large, long, taper pod, terminated by a sharp rising point, opening with two valves, having one row of roundish seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which contains those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. **PISUM** (*Sativum*) stipulis infernè rotundatis crenatis, petiolis teretibus, pedunculis multifloris. Hort. Upsal. 215. *Pea whose lower stipule are roundish and indented, with taper foot-stalks bearing many flowers. Pisum hortense majus, flore fructuque albo. C. B. P. 342. Greater Garden Pea with a white flower and fruit.*
2. **PISUM** (*Humile*) caule erecto ramoso, foliis bijugatis, foliolis rotundioribus. *Pea with an erect branching stalk, and leaves having two pair of round lobes. Pisum humile, caule firmo. Tourn. Inst. R. H. 394. Dwarf Pea with a firm stalk.*
3. **PISUM** (*Umbellatum*) stipulis quadrifidis acutis, pedunculis multifloris terminalibus. *Pea with four-pointed acute stipule, and foot-stalks bearing many flowers, which terminate the stalks. Pisum umbellatum. C. B. P. 342. The Rose or Crown Pea.*
4. **PISUM** (*Maritimum*) petiolis supra planiusculis, caule angulato, stipulis sagittatis, pedunculis multifloris. Flor. Suec. 608. *Pea with foot-stalks which are plain on their upper side, an angular stalk, arrow-pointed stipule, and foot-stalks bearing many flowers.*
5. **PISUM** (*Americanum*) caule angulato procumbente, foliolis inferioribus lanceolatis acutè dentatis, summis sagittatis. *Pea with an angular trailing stalk, whose lower leaves are spear-shaped and sharply indented, and those at the top arrow-pointed, commonly called Cape Horn Pea.*

6. **PISUM**

6. *Pisum* (*Ochrus*) petiolis decurrentibus membranaceis diphyllis, pedunculis unifloris. Hort. Cliff. 370. *Pea with membranaceous running foot-stalks, having two leaves and one flower upon a foot-stalk.* *Ochrus folio integro capreolos emittente.* C. B. P. 343. *Winged Pea with an entire leaf sending out tendrils.*

There are a great variety of Garden Peas now cultivated in England, which are distinguished by the gardeners and feedsmen, and have their different titles; but as great part of these are only feminal variations, and if not very carefully managed, by taking away all those plants which have a tendency to alter before the seeds are formed, they will degenerate into their original state, so that all those persons who are curious in the choice of their seeds, look carefully over those which they design for seeds at the time when they begin to flower, and draw out all the plants which they dislike from the other. This is what they call roguing their Peas, meaning hereby, the taking out all the bad plants from the good, that the farina of the former may not impregnate the latter; to prevent which, they always do it before the flowers are fully open; by thus diligently drawing out the bad, and marking those which come earliest to flower, they have greatly improved their Peas of late years, and are constantly endeavouring to get forwarder varieties; so that it would be to little purpose in this place, to attempt giving particular botanical titles to each which are now cultivated; therefore I shall only mention their titles by which they are commonly known, placing them according to their time of coming to the table, or gathering for use.

The Golden Hotspur.	Sugar Dwarf.
The Charlton.	Sickle Pea.
The Reading Hotspur.	Marrowfat.
Masters's Hotspur.	Dwarf Marrowfat.
Essex Hotspur.	Rose, or Crown Pea.
The Dwarf Pea.	Rouncival Pea.
The Sugar Pea.	Gray Pea.
Spanish Morotto.	Pig Pea, with some others.
Nonpareil.	

The English Sea Pea is found wild upon the shore in Sussex, and several other counties in England. This was first taken notice of in the year 1555, between Orford and Aldborough, where it grew upon the heath, where nothing, no not Grass, was ever seen to grow; and the poor people being in distress, by reason of the dearth of that year, gathered large quantities of these Peas, and so preserved themselves and families. This is mentioned by Stowe in his Chronicle, and Camden in his Britannia: but they were both mistaken, in imagining that they were Peas cast on shore by a shipwreck, seeing they grow in divers other parts of England, and are undoubtedly a different species from the common Pea.

The fifth sort hath a perennial root, which continues some years. This was brought from Cape Horn by Lord Anson's cook, when he passed that Cape, where these Peas were a great relief to the sailors. It is kept here as a curiosity, but the Peas are not so good for eating as the worst sort now cultivated in England; it is a low trailing plant; the leaves have two lobes on each foot-stalk, those below are spear-shaped, and sharply indented on their edges, but the upper leaves are small and arrow-pointed. The flowers are blue, each foot-stalk sustaining four or five flowers; the pods are taper, near three inches long, and the seeds are round, about the size of Tares.

The sixth sort is annual; this grows naturally amongst the Corn in Sicily and some parts of Italy, but is here preserved in botanic gardens for the sake of variety. It hath an angular stalk rising near three feet high; the leaves stand upon winged foot-stalks, each sustaining two oblong lobes. The flowers are of a pale yellow colour, and shaped like those of the other sorts of Pea, but are small, each foot-stalk sustaining one flower; these are succeeded by pods about two inches long, containing five or six roundish seeds, which are a little compressed on their sides. These are by some persons eaten green, but unless they are gathered very young, they are coarse, and at

best not so good as the common Pea. It may be sown and managed in the same way as the Garden Pea. I shall now proceed to set down the method of cultivating the several sorts of Garden Peas, so as to continue them throughout the season.

It is a common practice with the gardeners near London, to raise Peas upon hot-beds, to have them very early in the spring; in order to which, they sow their Peas upon warm borders under walls or hedges, about the middle of October; and when the plants come up, they draw the earth up gently to their stems with a hoe, the better to protect them from frost. In these places they let them remain till the latter end of January, or the beginning of February, if they are preserved from frosts, observing to earth them up from time to time as the plants advance in height (for the reasons before laid down) as also to cover them in very hard frost with Peas-haulm, straw, or some other light covering, to preserve them from being destroyed; then, at the time before-mentioned, they make a hot-bed (in proportion to the quantity of Peas intended) which must be made of good hot dung, well prepared and properly mixed together, that the heat may not be too great. The dung should be laid about three feet thick, or somewhat more, according as the beds are made earlier or later in the season; when the dung is equally levelled, then the earth (which should be light and fresh, but not over rich) must be laid on about six or eight inches thick, laying it equally all over the bed. This being done, the frames (which should be two or two and a half feet high on the back side, and about eighteen inches in front) must be put on, and covered with glasses; after which it should remain three or four days, to let the steam of the bed pass off, before you put the plants therein, observing every day to raise the glasses to give vent for the rising steam to pass off; then when you find the bed of a moderate temperature for heat, you should, with a trowel, or some other instrument, take up the plants as carefully as possible, to preserve the earth to the roots, and plant them into the hot-bed in rows about two feet asunder; and the plants should be set about an inch distant from each other in the rows, observing to water and shade them until they have taken root; after which you must be careful to give them air at all times when the season is favourable, otherwise they will draw up very weak, and be subject to grow mouldy and decay. You should also draw the earth up to the shanks of the plants as they advance in height, and keep them always clear from weeds. The water they should have must be given them sparingly, for if they are too much watered it will cause them to grow too rank, and sometimes rot off the plants at their shanks just above ground. When the weather is very hot, you should cover the glasses with mats in the heat of the day, to screen them from the violence of the sun, which is then too great for them, causing their leaves to flag, and their blossoms to fall off without producing pods, as will also the keeping the glasses too close at that season. But when the plants begin to fruit, they should be watered oftener, and in greater plenty than before; for by that time the plants will have nearly done growing, and the often refreshing them will occasion their producing a greater plenty of fruit.

The sort of Pea which is generally used for this purpose is the Dwarf, for all the other sorts ramble too much to be kept in frames; the reason for sowing them in the common ground, and afterwards transplanting them on a hot-bed, is also to check their growth, and cause them to bear in less compass; for if the seeds were sown upon a hot-bed, and the plants continued thereon, they would produce such luxuriant plants as are not to be contained in the frames, and would bear but little fruit.

The next sort of Pea which is sown to succeed those on the hot-bed is the Hotspur, of which there are reckoned three or four sorts; as the Golden Hotspur, the Charlton Hotspur, the Masters's Hotspur, the Reading Hotspur, and some others, which are very little differing from each other, except in their early

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bearing

bearing, for which the Golden and Charlton Hotspurs are chiefly preferred; though if either of these sorts are cultivated in the same place for three or four years, they are apt to degenerate and be later in spring-fruiting, for which reason most curious persons procure their seeds annually from some distant place; and in the choice of these seeds, if they could be obtained from a colder situation and a poorer soil, than that in which they are to be sown, it will be much better than on the contrary, and they will come earlier in the spring. These must also be sown on warm borders, towards the latter end of October; and when the plants are come up, you should draw the earth up to their shanks in the manner before directed; which should be repeated as the plants advance in height (always observing to do it when the ground is dry) which will greatly protect the stems of the plants against frost; and if the winter should prove very severe, it will be of great service to the plants to cover them with Peas-haulm, or some other light covering; which should be constantly taken off in mild weather, and only suffered to remain on during the continuance of the frost; for if they are kept too close, they will be drawn very weak and tender, and thereby be liable to be destroyed with the least inclemency of the season.

In the spring you must carefully clear them from weeds, and draw some fresh earth up to their stems; but do not raise it too high to the plants, lest by burying their leaves you should rot their stems, as is sometimes the case, especially in wet seasons. You should also observe to keep them clear from vermin, which, if permitted to remain amongst the plants, will increase so plentifully as to devour the greatest part of them. The chief of the vermin which infest Peas are the slugs, which lie all the day in the small hollows of the earth, near the stems of the plants, and in the night time come out, and make terrible destruction of the Peas; and these chiefly abound in wet soils, or where a garden is neglected, and over-run with weeds; therefore you should make the ground clear every way round the Peas to destroy their harbours, and afterwards in a fine mild morning very early, when these vermin are got abroad from their holes, you should slack a quantity of lime, which should be sown hot over the ground pretty thick, which will destroy the vermin wherever it happens to fall upon them, but will do very little injury to the Peas, provided it be not scattered too thick upon them. This is the best method I could ever find to destroy these troublesome vermin.

If this crop of Peas succeeds, it will immediately follow those on the hot bed; but for fear this should miscarry, it will be proper to sow two more crops at about a fortnight's distance from each other, so that there may be the more chances to succeed. This will be sufficient until the spring of the year, when you may sow three more crops of these Peas; one toward the beginning of January, the other a fortnight after, and the third at the end of January. These two late sowings will be sufficient to continue the early sort of Peas through the first season, and after this it will be proper to have some of the large sort of Peas to succeed them for the use of the family; in order to which, you should sow some of the Spanish Morotto, which is a great bearer, and a hardy sort of Pea, about the middle of February, upon a clear open spot of ground. These must be sown in rows about three feet asunder, and the Peas should be dropped in the drills about an inch distance, covering them about two inches deep with earth, being very careful that none of them lie uncovered, which will draw the mice, pigeons, or rooks, to attack the whole spot; and it often happens by this neglect, that a whole plantation is devoured by these creatures; whereas, when there are none of the Peas left in sight, they do not so easily find them out.

About a fortnight after this you should sow another spot, either of this sort, or any other large sort of Pea, to succeed those, and then continue to repeat sowing once a fortnight, till the middle or latter end of May, some of these kinds, only observing to allow

the Marrowfats, and other very large sorts of Peas, at least three feet and a half, or four feet between row and row; and the Rose Pea should be allowed at least eight or ten inches distance plant from plant in the rows, for these grow very large; and if they have not room allowed them, they will spoil each other by drawing up very tall, and will produce no fruit.

When these plants come up, the earth should be drawn up to their shanks (as was before directed) and the ground kept entirely clear from weeds; and when the plants are grown eight or ten inches high, you should stick some rough boughs, or brushwood, into the ground close to the Peas, for them to ramp upon, which will support them from trailing upon the ground, which is very apt to rot the large-growing sorts of Peas, especially in wet seasons; besides, by thus supporting them, the air can freely pass between them, which will preserve the blossoms from falling off before their time, and occasion them to bear much better than if permitted to lie upon the ground, and there will be room to pass between the rows to gather the Peas when they are ripe.

The dwarf sorts of Peas may be sown much closer together than those before-mentioned, for these seldom rise above a foot high, and rarely spread above half a foot in width, so that these need not have more room than two feet row from row, and not above an inch asunder in the rows. These produce a good quantity of Peas, provided the season is not over-dry, but they seldom continue long in bearing, so that they are not so proper to sow for the main crop, when a quantity of Peas is expected for the table, their chief excellency being for hot-beds, where they will produce a greater quantity of Peas (provided they are well managed) than if exposed to the open air, where the heat of the sun soon dries them up.

The Sickle Pea is much more common in Holland than in England, it being the sort mostly cultivated in that country; but in England they are only propagated by curious gentlemen for their own table, and are rarely brought into the markets. This sort the birds are very fond of, and if they are not prevented, many times destroy the whole crop. This should be planted in rows about two feet and a half asunder, and should be managed as hath been directed for the other sorts. Although I have directed the sowing of the large sorts of Peas for the great crop, yet these are not so sweet as the early Hotspur Peas; therefore it will also be proper to continue a succession of those sorts through the season, in small quantities, to supply the best table, which may be done by sowing some every week or ten days; but all those which are sown late in the season, should have a strong moist soil, for in hot light land they will burn up and come to nothing.

The large-growing sorts may be cultivated for the common use of the family, because these will produce in greater quantities than the other, and will endure the drought better, but the early kinds are by far the sweeter tasted Peas.

The best of all the large kinds is the Marrowfat, which if gathered young, is a well-tasted Pea, and this will continue good through the month of August if planted on a strong soil.

The gray and other large winter Peas are seldom cultivated in gardens, because they require a great deal of room, but are usually sown in fields in most parts of England. The best time for sowing these is about the beginning of March, when the weather is pretty dry, for if they are put into the ground in a very wet season, they are apt to rot, especially if the ground be cold; these should be allowed at least three or four feet distance row from row, and must be sown very thin in the rows; for if they are sown too thick, the haulm will spread so as to fill the ground, and ramble over each other, which will cause the plants to rot, and prevent their bearing.

The common white Pea will do best on light sandy land, or on a rich loose soil. The usual method of sowing these Peas is with a broad cast, and so harrow them in; but it is a much better way to sow them in drills

P I T

drills about three feet asunder, for less than half the quantity of seed will do for an acre, and being set regularly, the ground may be stirred with a hoe to destroy the weeds, and earth up the Peas, which will greatly improve them, and the Peas may be much easier cut in autumn, when they are ripe. The usual time for sowing these Peas is about the middle of March, or the beginning of April, on warm land, but on cold ground they should be sown a fortnight or three weeks later. In the common way of sowing, they allow three bushels or more to an acre; but if they are drilled, one bushel and a half will be full enough.

The Green and Maple Rouncivals require a stronger soil than the White, and should be sown a little later in the spring; also the drills should be made at a greater distance from each other, for as these are apt to grow rank, especially in a wet season, they should be set in rows two feet and a half or three feet asunder; and the ground between the rows should be stirred two or three times with a hoe, which will not only destroy the weeds, but, by earthing up the Peas, will greatly improve them, and also render the ground better to receive whatever crop is put on it the following season.

The gray Peas thrive best on a strong clayey land; these are commonly sown under furrow, but by this method they are always too thick, and do not come up regular; therefore all these rank-growing plants should be sown in drills, where the seeds will be more equally scattered, and lodged at the same depth in the ground; whereas in the common way some of the seeds lie twice as deep as others, and are not scattered at equal distances. These may be sown toward the end of February, as they are much hardier than either of the former sorts, but the culture for these should be the same.

The best method to sow these Peas is to draw a drill with a hoe by a line about two inches deep, and then scatter the seeds therein; after which, with a rake, you may draw the earth over them, whereby they will be equally covered, and this is a very quick method for gardens; but where they are sown in fields, they commonly make a shallow furrow with the plough, and scatter the seeds therein, and then with a harrow they cover them over again. After this, the great trouble is to keep them clear from weeds, and draw the earth up to the plants; this, in such countries where labour is dear, is a great expence to do it by the hand with a hoe; but this may be easily effected with a horse-hough, which may be drawn through between the rows, which will entirely eradicate the weeds, and by stirring the soil render it mellow, and greatly promote the growth of the plants.

When any of the best sorts are intended for seed, there should be as many rows of them left ungathered, as may be thought necessary to furnish a sufficient quantity of seed; and when the Peas are in flower, they should be carefully looked over, to draw out all those plants which are not of the right sort; for there will always be some rogish plants (as the gardeners term them) in every sort, which, if left to mix, will degenerate the kind. These must remain until their pods are changed brown and begin to split, when you should immediately gather them up, together with the haulm; and if you have not room to stack them till winter, you may thresh them out as soon as they are dry, and put them up in sacks for use; but you must be very careful not to let them remain too long abroad after they are ripe, for if wet should happen it would rot them; and heat, after a shower of rain, would cause their pods to burst, and cast forth their seeds, so that the greatest part of them would be lost; but, as I have said before, it is not advisable to continue sowing of the same seed longer than two years on the same ground, for the reasons there laid down, but rather to exchange their seeds every year, or every two years at least, whereby you may always expect to have them prove right.

PISUM CORDATUM. See CARDIOSPERMUM.

PITTONIA. See TOURNEFORTIA.

P L A

PLANTA, a Plant, is defined by the ingenious Mr. John Martyn to be an organical body, destitute of sense and spontaneous motion, adhering to another body in such a manner, as to draw from it its nourishment, and having power of propagating itself by seed. As to the parts of which a plant consists, they are the root, stalk, leaf, flower, and fruit.

Plant and vegetable are pretty near terms synonymous, all plants being vegetables. Dr. Boerhaave defines a vegetable to be a body generated of the earth, or something arising of the earth, to which it adheres, or is connected by parts called roots, through which it receives the matter of its nourishment and increase, and consists of juices and vessels sensibly distinct from each other; or a vegetable is an organical body, composed of vessels and juices, every where distinguishable from each other; to which body grow roots or parts, whereto it adheres, and from which it derives the matter of its life and growth.

This definition furnishes a just and adequate idea of a vegetable; for by its consisting of vessels and juices, it is distinguished from a fossil; and by its adhering to another body, and deriving its nourishment therefrom, it is distinguished from an animal.

A vegetable is defined an organical body, because consisting of different parts, which jointly concur to the exercise of the same functions, adhering by some of its parts to another body; for we know of no plant that is absolutely vague and fluctuating, but has still a body it adheres to, though that body may be various, e. g. Earth, as in our common plants; stone, as in rock plants; water, as in sea plants; and air, as some mucilages.

As to those few plants which appear to float in the water, their manner of growth is something anomalous. Monsieur Tournefort has shewn that all plants do not arise strictly from seeds, but that some, instead of semen, deposit or let fall a little drop of juice, which, sinking in the water, reaches the bottom, or some rock, &c. in its way, to which it sticks, strikes root, and shoots into branches; such is the origin of coral. Add, that the root of a plant may have any situation at pleasure, with respect to the body thereof, nor needs it either be lowest or highest, &c. Accordingly in Aloes, Mistleto, Coral, Mosses, Funguses, &c. the root is frequently uppermost, and its growth downwards.

The vessels or containing parts of plants consist of mere earth, bound or connected together by oil, as a gluten, which being exhausted by fire, air, age, or the like, the plant moulders, or returns again into its earth or dust. Thus, in vegetables burnt by the intensest fire, the earth or matter of the vessels is left entire, and indissoluble by its utmost forces, and consequently the matter thereof is neither water, nor air, nor salt, nor sulphur, but earth alone.

The root or part whereby vegetables are connected to their matrix, and by which they receive their nutritious juice, consists of an infinite number of absorbent vessels, which, being dispersed through the interstices of the earth, attract or imbibe the juices of the same; consequently, every thing in the earth that is dissoluble in water, is liable to be imbibed, as air, salt, oil, fumes of mineral, metal, &c. and of these plants really consist.

These juices are drawn from the earth very crude, but by the structure and fabric of the plant, and the various vessels they are strained through, become changed, further elaborated, secreted, and assimilated to the substance of the plant.

The motion of the nutritious juices of vegetables is produced much like that of blood in animals, by the action of the air; in effect, there is something equivalent to respiration throughout the whole plant.

The discovery of this we owe to the admirable Malpighi, who first observed that vegetables consist of two series or orders of vessels; first, such as receive and convey the alimential juices, answering to the arteries, lacteals, veins, &c. of animals; secondly, tracheæ, or air-vessels, which are long hollow pipes, wherein

wherein air is commonly received and expelled, i. e. inspired and expired; within which tracheæ he shews all the former series of vessels are contained.

Hence it follows, that the heat of a year, nay, of a day, of a single hour or minute, must have an effect on the air included in these tracheæ, i. e. must rarefy it, and consequently dilate the tracheæ, whence arises a perpetual spring or source of action to promote the circulation in plants.

PLANTAGO. Tourn. Inst. R. H. 126. tab. 48. Lin. Gen. Plant. 133. Plantain. To this genus Dr. Linnæus has joined the Coronopus and Pysyllium of Tournefort. The first of these is called Hart's-horn, the latter Fleawort. Of these there are several distinct species, and some varieties; but as they are rarely cultivated in gardens, I shall not enumerate them all here, and shall only mention such of them as grow naturally in England. Of the Plantain there are the following sorts; the common broad-leaved Plantain, called Waybread; the great hoary Plantain or Lamb's-tongue; the narrow-leaved Plantain or Ribwort; and the following varieties have also been found in England, which are accidental; the Besom Plantain, and Rose Plantain. The Plantains grow naturally in pastures in most parts of England, and are frequently very troublesome weeds. The common Plantain and Ribwort Plantain are both used in medicine, and are so well known as to need no description. Of the Coronopus or Buck's-horn Plantain there are two varieties growing in England, viz. the common Buck's-horn, which grows plentifully on heaths every where, and the narrow-leaved Welsh sort which is found upon many of the Welsh mountains. The first of these was formerly cultivated as a fallad herb in gardens, but has been long banished from thence for its rank disagreeable flavour; it is sometimes used in medicine. There has been one species of Pysyllium or Fleawort found growing naturally in England, which is the sort used in medicine, which was in the earth thrown out of the bottom of the canals which were dug for the Chelsea water-works, where it grew in great plenty. The seeds of this must have been buried there some ages, for no person remembers any of the plants growing in that neighbourhood before. The seeds of this are sometimes used, which are imported from the South of France.

There are several varieties of all these three sorts, which are sometimes preserved in botanic gardens, but having no beauty, they are not admitted into any other, so I shall pass them over here, as being weeds wherever they are permitted to feed.

PLANTAIN-TREE. See MUSA.

PLANTING. Although the method of Planting the various sorts of trees is fully set down under their several articles, where each kind is mentioned, yet it may not be amiss to say something in general upon that head in this place, which shall be treated as briefly as possible. And,

First, the first thing in Planting of trees is to prepare the ground (according to the different sorts of trees intended to be planted) before the trees are taken out of the earth; for you should suffer them to remain as little time out of the ground as possible.

In taking up the trees you should carefully dig away the earth round their roots, so as to come at their several parts to cut them off; for if they are torn out of the ground without care, the roots will be broken and bruised very much to the great injury of the trees. When they are taken up, the next thing is to prepare them for Planting; in doing of which there are two things to be principally regarded; the one is to prepare the roots, and the other to prune their heads, in such a manner as may be most serviceable in promoting the future growth of the trees.

And first as to the roots; all the small fibres are to be cut off as near to the place from whence they are produced as may be (excepting such trees as are to be replanted immediately after they are taken up;) otherwise the air will turn all the small roots and fibres black, which, if permitted to remain on when the tree

is planted, will grow mouldy and decay, and thereby greatly injure the new fibres which are produced, so that many times the trees miscarry for want of duly observing this. After the fibres are cut off, all the bruised or broken roots should be cut smooth, otherwise they are apt to rot and distemper the trees; and all irregular roots which cross each other, and the downright roots, (especially in fruit-trees) must be cut off; so that when the roots are regularly pruned, they may in some measure resemble the fingers of a hand when spread open; then the larger roots should be shortened in proportion to the age and strength of the tree, as also the particular sorts of trees are to be considered; for the Walnut, Mulberry, and some other tender-rooted kinds should not be pruned so close, as the more hardy sorts of fruit or forest-trees, which in young fruit-trees, such as Pears, Apples, Plums, Peaches, &c. that are one year old from budding or grafting, may be left about eight or nine inches long; but in older trees they must be left of a much greater length; but this is to be understood of the larger roots only, for the small ones must be quite cut out, or pruned very short. Their extreme parts, which are generally very weak, commonly decay after moving, so that it is the better way entirely to displace them.

The next thing is the pruning of their heads, which must be differently performed in different trees, for the design of the trees must also be considered; if they are fruit-trees, and intended for walls or espaliers, it is the better way to plant them with the greatest part of their heads, which should remain on until the spring, just before the trees begin to shoot, when they must be cut down to five or six eyes (as is fully inserted in the several articles of the various kinds of fruit) being very careful, in doing of this, not to disturb the new roots.

But if the trees are designed for standards, you should prune off the small branches close to the places where they are produced; as also irregular branches which cross each other, and by their motion, when agitated by the wind, rub and bruise their bark, so as to occasion many times great wounds in those places; besides, it makes a disagreeable appearance to the sight, and adds to the closeness of its head, which should always be avoided in fruit-trees, whose branches should be preserved as far distant from each other, as they are usually produced when in a regular way of growth, (which is in all sorts of trees proportionable to the size of their leaves, and magnitude of their fruit) for when their heads are very thick, which is often occasioned by the unskillful shortening of their branches, the sun and air cannot freely pass between the leaves, so that the fruit must be small and ill-tasted. But to return: after having displaced these branches, you should also cut off all such parts of branches, as have by accident been broken or wounded; for these will remain a disagreeable sight, and often occasion a disease in the tree. But you should by no means cut off the main leading shoots, as is by too many practised, for those are necessary to attract the sap from the root, and thereby promote the growth of the tree; for from several experiments which I made in the winter 1729, by cutting off the branches of several sorts of trees, and putting them into phials filled with water, whose tops were closely covered to prevent the evaporating of the water, I found, that those shoots, whose leading buds were preserved, did attract the moisture in much greater quantities than those shoots whose tops were cut off; and from several experiments made by the Rev. Dr. Hales, we find that great quantities of moisture are imbibed at wounds, where branches are cut off; so that by thus shortening the branches, the wet, which generally falls in great plenty during the winter season, is plentifully imbibed, and for want of leaves to perspire it off, mixes with the sap of trees, and thereby distending the vessels, destroys their contracting force, which many times kills the tree, or at least weakens it so much as not to be recovered again for some years, as I have several times observed.

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But being willing to try this experiment again in the month of October 1733, I made choice of two standard Almond-trees of equal strength and age; these I took up as carefully as possible, and having prepared their roots as before directed, I pruned their heads in the following manner, viz. from one of them I only cut off the small branches, and such as were bruised or broken, but preserved all the strong ones entire; of the other, I shortened all the strong branches, and pruned off the weak and broken shoots, as is the common practice. These two trees I planted in the same soil and to the same situation, gave them both equal attendance, and managed them both as nearly alike as possible; yet in the spring, when these trees began to shoot, that, whose branches were entirely preserved, came out early, continued to shoot stronger, and is at present much larger, and in better health than the other. And since this I have made several other experiments of the like nature, which have constantly succeeded in the same manner, from whence it is reasonable to conclude, that the shortening of the branches is a great injury to all new-planted trees, but especially to Cherries and Horse Chestnuts, which are frequently killed by shortening their large branches when they are removed.

Having thus prepared the trees for Planting, we must now proceed to the placing them into the ground; but before this, I would advise, if the trees have been long out of the ground, so that the roots are dried, to place them in water eight or ten hours before they are planted, observing to put them in such manner, that their heads may remain erect, and their roots only immersed therein, which will swell the dried vessels of the roots, and prepare them to imbibe nourishment from the earth. In fixing of them, great regard should be had to the nature of the soil, which if cold and moist, the trees should be planted very shallow; as also, if it be a hard rock or gravel, it will be much the better way to raise a hill of earth where each tree is to be planted, than to dig into the rock or gravel, and fill it up with earth (as is too often practised), whereby the trees are planted, as it were in a tub, there being but little room for their roots to extend; so that after two or three years growth, when their roots have extended to the sides of the hole, they are stopped by the rock or gravel, can get no farther, whereby the trees will decline, and in a few years die; besides, these holes detain the moisture so, that the fibres of the plants are often rotted thereby. But when they are raised above the surface of the ground, their roots will extend and find nourishment, though the earth upon the rock or gravel be not three inches thick, as may be frequently observed, where trees are growing upon such soils.

The next thing to be observed is to place the tree in the hole in such manner, that the roots may be about the same depth in the ground, as they were growing before they were taken up; then break the earth fine with a spade, and scatter it into the hole, so that it may fall in between every root, that there may be no hollows in the earth (but you should by no means lift or screen the mould, for reasons given in some other places); then having filled in the earth, you should gently tread it close with your feet, but do not make it too hard, which is a very great fault, especially if the ground is strong and inclineable to bind.

Having thus planted the trees, you should provide a parcel of stakes, one of which should be driven down by the sides of the trees, and fastened thereto to support them from being blown down or displaced by the wind; then lay some mulch upon the surface of the ground, about their roots, to prevent the earth from drying.

This is to be understood of standard-trees which cast their leaves; for such as are planted against walls, should have their branches fastened to the wall to prevent the trees from being displaced by the wind; but there is no difference in their management, only to preserve their heads entire, and to place their roots

about five inches from the wall, inclining their heads thereto; and the spring following, just before they shoot, their heads should be cut down to five or six buds, as is fully directed under the several articles of the different kinds of fruit.

As to the watering of all new-planted trees, I should advise it to be done with great moderation, nothing being more injurious to them than over-watering. Examples enough of this kind may have been seen in many parts of England, where there has been plantations made, which have been over-watered, whereby the greatest part of the trees have failed, or those which have survived, have made little progress, occasioned by the abundance of water given to them, whereby the fibres were rotted off as soon as produced. And how can any person imagine that a tree should thrive, when the ground, in which it is planted, is continually floated with water? for by an experiment made by the Rev. Dr. Hales, in placing the roots of a dwarf Pear-tree in water, the quantity of moisture imbibed decreased very much daily, because the sap-vessels of the roots, like those of the cut-off boughs in the same experiment, were so saturated and clogged with moisture, by standing in water, that more of it could not be drawn up. And this experiment was tried upon a tree which was full of leaves, and thereby more capable to discharge a large quantity of moisture than such trees as are entirely destitute of leaves; so that it is impossible such trees can thrive, where the moisture is too great about their roots.

The seasons for planting are various, according to the different sorts of trees, or the soil in which they are planted; for such trees whose leaves fall off in winter, the best time is in the middle or end of October, provided the soil be dry; but for a very wet soil, it is better to defer it until the latter end of February, or the beginning of March; and for many kinds of Evergreens, the beginning of April is by far the best season, though some sorts may be safely removed at Midsummer, provided they are not to be carried very far; but you should always make choice of a cloudy season; if possible, at that time of the year, when they will take fresh root in a few days. And, on the contrary, when these trees are removed in winter, during which time they are almost in a state of rest, they do not take root until the spring advances, and sets the sap in motion; so that many times they die, especially if the winter proves severe.

As to the preparing the soil for Planting, that must also be done to suit the different sorts of trees, some requiring a light soil, others a strong one, &c. But this is fully set down in the several articles of trees, under their proper heads, to which the reader is desired to turn; though for the fruit-trees in general, a fresh soil from a pasture ground, which is neither too light and dry, nor over-strong and moist, but rather a gentle, soft, loamy earth is to be preferred, provided it be exposed some time. And if it be for wall trees, will be the better if the borders are filled with this earth six or eight feet wide, but it need not be above two feet and a half deep at most; for when the borders are made too deep, the roots of these trees are enticed downward, which is of bad consequence to fruit-trees, as hath been elsewhere observed. The same also must be observed for standard-trees (where fresh earth is brought to the places in which they are planted), not to make the holes too deep, but rather let them have the same quantity of earth in width, which is much to be preferred.

There are several persons who direct the placing of the same side of the tree to the south, which before removing had that position, as a material circumstance to be strictly regarded; but from several trials which I have made, I could not observe the least difference in the growth of those trees which were so placed, and others which were reversed; so that I conclude, it is not of any consequence to observe this method.

The distance which trees should be planted at, must also be proportioned to their several kinds, and the

several purposes for which they are intended, all which is explained under their several heads; but fruit-trees, planted either against walls, or for espaliers, should be allowed the following distances: for most sorts of vigorous-shooting Pear-trees, from thirty-six to forty feet; for Apricots, sixteen or eighteen feet; Apples, twenty-five or thirty feet; Peaches and Nectarines, twelve feet; Cherries and Plums, twenty-five feet, according to the goodness of the soil or the height of the wall. But as these things are mentioned in the several articles of fruit-trees, it will be needless to repeat any more in this place.

What hath been mentioned on this article chiefly relates to fruit-trees and evergreens, for the adorning of gardens; but I shall now proceed to the planting of forest and other trees, which are in all large plantations of parks and extensive gardens the most numerous. The modern practice of transplanting these sorts of trees from hedge-rows and woods of large sizes, and at a great expence, has too generally prevailed in this kingdom, the generality of planters being in too great haste, and by a mistaken notion of saving time, begin by transplanting such large trees as they find on their own estates, or that they can procure in their neighbourhood, and please themselves with the hopes of having fine plantations soon; but if, instead of removing these trees, they would begin by making a nursery, and raising of their trees from seeds, they would set out in a right method, and save a great expence and much time, and they would have the constant pleasure of seeing their trees annually advance in their growth, instead of their growing worse, as will always be the case where old trees are removed, though many persons flatter themselves with the hopes of success, when they find their trees shoot out the following season; and as these will often continue to grow for some years after, so they continue their expectations, till after waiting many years, in which time they might have had seedling trees grown up to a fine size, if they had been sown at the time the large trees were planted, they then find their trees annually decaying, when they most expected their increase; for of all the plantations which I have yet seen of these large trees of any sort, there is scarce one which has ever succeeded. And if those persons who are disposed to plant, would be so kind to themselves as to survey with attention, as many of the modern plantations of this kind as they conveniently can, they will be convinced of the truth of this fact; but there are very few who give themselves time to deliberate before they begin, so that until they meet with disappointments, they scarce reflect on what they are doing. And it too often happens, that the persons employed in the executing, either through ignorance, or some other motive, encourage this practice of Planting.

In some of these plantations, all the Elms which could be procured from the neighbouring hedge-rows have been removed, most of which have been suckers produced from the old stumps, so have scarce any roots: these have, at a great expence, been planted and watered, and perhaps many of them have made considerable shoots, the whole length of the stem at every knot, and many of them have continued ten or twelve years alive, but have not increased in the girth of their stems half an inch, and all that time have been decaying at their heart, and growing hollow; so that when a severe frost in winter, or a great drought in summer, has happened, there has been an almost total destruction of the trees.

In other places I have seen great numbers of tall Oaks transplanted, which have appeared to thrive for some years when first planted; but in five or six years after have begun to decay at their top, and have leisurely died to the ground, than which nothing can be a more disagreeable sight to the owner. And the method which is commonly practised in transplanting of these trees would destroy them, were there a possibility of such large trees surviving their removal, which is, that of cutting off all their branches; for,

were the same practised on a tree of the same age unremoved, it would stint the growth so much as not to be recovered in several years, nor would it ever arrive to the size of such as have all their branches left on them. But the reason given for this practice is, that if the branches were left upon the trees, they could not be supported, the winds would throw them out of the ground; and another (which is bad philosophy) is, that as the roots have been greatly reduced by transplanting, so the heads of the trees should be reduced in the same proportion. As to the first, it must be allowed, that trees which are removed with great heads, are with great difficulty preserved in their upright situation; for the winds will have such power against the branches as to overset the trees, if they are not very strongly supported with ropes. Therefore this may be brought as an objection to the transplanting of large trees, rather than in support of a practice which is so prejudicial to them; and as to the other reason, it has no foundation; for if large amputations are made at the root, there should not be the same practised on the head; because the wounded part of the head will imbibe the air at every orifice, to the great prejudice of the tree. Besides this, if we pay any regard to the doctrine of the circulating of the juices in plants, we must allow, that the heads of the trees are equally useful to nourish the roots, as the roots are to the heads; so that if there is a waste of sap both at the top and bottom of the trees, it must weaken them in proportion. For whoever will be at the trouble to try the experiment on two trees of equal age and health, and to cut the branches off from one, and leave them upon the other at the time of transplanting, if the latter is well secured from blowing down, it will be found to succeed much better than the other; or if the same thing is practised upon two trees left standing, the tree whose branches are cut off, will not make half the progress as the other, nor will the stem increase in its bulk half so fast. Therefore where trees are transplanted young, there will be no necessity for using this unnatural amputation, and the success of these plantations will always give pleasure to the owner. I have seen some plantations of Oak-trees, which were made fifty years ago, and had thriven beyond expectation most part of the time, but are now annually decaying, and seem as if they would not continue many years longer, when the trees on the same soil and in the same situation, which were left standing, are in perfect health and vigour; and some of these transplanted trees which have been cut down, were found to be of little value, their timber being shaken and bad.

It is common to hear persons remarking, that from the present spirit of Planting, great advantages will accrue to the public by the increase of timber; but whoever is the least skilled in the growth of timber must know, that little is to be expected from most of the plantations which have lately been made; for there are few persons who have had this in their view when they commenced planters, and of those few scarce any of them have set out right; for there never was any valuable timber produced from trees which were transplanted of any considerable size, nor is any of the timber of the trees which are transplanted young, equal in goodness to that which has grown from the seeds unremoved. Beside, if we consider the sorts of trees which are usually planted, it will be found, that they are not designed for timber; so that upon the whole, it is much to be doubted, whether the late method of planting has not rather been prejudicial to the growth and increase of timber, than otherwise.

Before I quit this subject of Planting, I must beg leave to observe, that most people are so much in a hurry about Planting, as not to take time to prepare their ground for the reception of trees, but frequently make holes and stick in the trees, amongst all sorts of rubbish which is growing upon the land: and I have frequently observed, that there has not been any care afterward taken to dig the ground; or

root

root out the noxious plants; but the trees have been left to struggle with these bad neighbours, who have had long possession of the ground, and have established themselves so strongly as not to be easily overcome; therefore, what can be expected from such plantations? This is to be understood of deciduous trees, for the Pines and Firs, if once well rooted in the ground, will soon get the better of the plants and destroy them.

There are some other persons who begin better than the former, and who will be at the expence of preparing the ground and of Planting their trees, but afterward take very little care of them; so that it is common to see them overgrown with weeds in a year after they are planted, whereby the trees receive so much injury as to retard their growth, and many times, if the trees are young, they are totally destroyed. Therefore I would advise every person who proposes to plant, to prepare the ground well before-hand, by trenching or deep ploughing it, and clearing it from the roots of all bad weeds; for by so doing, there will be a foundation laid for the future success of the plantation. Also I advise no person to undertake more of this work than he can afterward keep clean, for all plantations of deciduous trees will require this care, or at least for seven years after they are made, if they hope to see the trees thrive well. Therefore all small plantations should have the ground annually dug between the trees; and as to those which are large, it should be ploughed between them. This will encourage the roots of the trees to extend themselves, whereby they will find a much greater share of nourishment, and by loosening the ground, the moisture and air will more easily penetrate to the roots, to the no small advantage of the trees. But besides this operation, it will be absolutely necessary to hoe the ground three or four times in summer, either by hand or the hoe-plough. This I am aware will be objected to by many, on account of the expence; but if the first hoeing is performed early in the spring, before the weeds have gotten strength, a great quantity of ground may be gone over in a short time; and if the season is dry when it is performed, the weeds will presently die after they are cut; and if this is repeated before the weeds come up again to any size, it will be found the cheapest and very best husbandry; for if the weeds are suffered to grow till they are large, it will be a much greater expence to root them out, and make the ground clean; besides, the weeds will rob the trees of great part of their nourishment. I have sometimes been told, That it is necessary to let the weeds grow among trees in summer, in order to shade their roots, and keep the ground moist, but this has come from persons of no skill; but as others may have been deceived by such advice, I imagine it may not be improper to give some answer to this. And here I must observe, That if weeds are permitted to grow, they will draw away all moisture from the roots of the trees for their own nourishment, so that the trees will be thereby deprived of the kindly dews and the gentle showers of rain, which are of great service to young plantations; and these will be entirely drawn away by the weeds, which will prevent their penetrating the ground, so that it is only the great rains which can descend to the roots of the trees. And whoever has the least doubt of this matter, if they will but try the experiment, by keeping one part of the plantation clean, and suffer the weeds to grow on another, they will soon be convinced of the truth by the growth of the trees. And though this cleaning is attended with an expence, yet the success will overpay this, beside the additional pleasure of seeing the ground always clean.

In the disposition of trees in parks, and of shrubs and trees in gardens, there are very few of those who call themselves designers, who have had much regard to this particular; for in most of the modern plantations, it is not uncommon to see an Oak, an Elm, or some other large-growing tree planted where a Rose-bush, a Honeysuckle, or Sweet-briar, might with more propriety occupy the space: so that in a

few years, if these large trees are left growing, the whole plantation must make a disagreeable appearance; but having already mentioned these things under the article of GARDENS, I shall not enlarge farther on them here.

PLANTING REVERSE: Dr. Agricola tells us, That he has made several experiments on the branches of foreign trees, as well Orange as Laurel, which he performed after the manner following; he first stripped the branches of all the leaves; then he bent and tied them, dressed them with his noble mummy, and planted them the reverse way, so that nothing was to be seen of all the branches but the great ends, and kept them during the winter in his stove.

He adds, That those who have a mind to raise trees this way, which he calls monstrous fruit-trees, may raise Apples, Pears, Cherries, Apricots, Peaches, Mulberries, Walnut-trees, &c. also Rose-trees, Gooseberry bushes, &c. which he directs to do something more at large, as follows:

Take those branches that are furnished with long side shoots or twigs, and bend the side twigs in the joints toward the great branches, and tie them together with bass or packthread; then dress them with mummy, either with a brush only near the ligature, and here and there on the joints, or dip them entirely into it; then having made a deep hole in the ground set the branches the reverse way, so that nothing but the long end of the branch appears above ground, the rest being covered with good, fat, and well broken earth. This being done, the little branches will take root in the joints every where; then the buds will begin to shoot, so that you may see fifty or sixty more branches spring up, making an agreeable as well as monstrous figure.

Mr. Fairchild of Hoxton had begun to put the same into practice, and he gives directions for performing it as follows:

First, to make choice of a young tree of one shoot, either of Alder, Elm, or Willow, or any other tree that will take root easily by laying, and to bend the extreme part of the shoot gently down into the earth, and so let it remain till it has taken root, so that the plant then will resemble an arch or bent bow above the ground.

When this top end has well struck new roots, to dig about the first root, and raise it gently out of the ground, till the stem is upright, and so stake it up, otherwise it will be apt to bend.

Then to prune those roots that are erected in the air, from the bruises and wounds which they received in being dug up, and do over with a brush the pruned parts with the following composition, moderately warm:

Take four ounces of tallow, four ounces of bees-wax, two ounces of resin, and two ounces of turpentine, melted together in a pipkin.

After this prune off all the buds or shoots that are upon the stem or plant, and dress the wound with the same composition, to prevent any collateral shootings, that may spoil the beauty of the stem.

Besides, care is to be taken, that the new-growing roots of this reversed plant be well nourished; and therefore that part of the shoot which was the larger, is to be cut away a little below the earth, that the stem may be better nourished, and its roots translated. These experiments are curious but not useful, because these reversed trees never shoot perpendicular, but their branches incline to the ground, retaining their former method of growing.

PLATANUS. Tourn. Inst. R. H. 590. tab. 363. Lin. Gen. Plant. 954. [πλατάνος, of πλατύς, broad, because the leaves of this tree are broad.] The Plane-tree.

The CHARACTERS are,

It hath male and female flowers growing separate on the same tree. The male flowers are collected in a round ball; they have no petals, but have very small empalements, which have oblong coloured stamina, terminated by four-cornered summits. The female flowers have small scaly empalements,

empalaments, and several small concave petals, with several awl-shaped germen sitting upon the styles, crowned by recurved stigmas; these are collected in large balls. The germen afterward turns to a roundish seed sitting upon the bristly style, and surrounded with downy hairs.

This genus of plants is ranged in the eighth section of Linnæus's twenty-first class, which includes those plants which have male and female flowers separated on the same plant, whose male flowers have many stamina.

The SPECIES are,

1. PLATANUS (*Orientalis*) foliis palmatis. Hort. Cliff. 447. *Plane-tree with hand-shaped leaves.* Platanus Orientalis verus. Park. Theat. 1427. *The true Eastern Plane-tree.*
2. PLATANUS (*Occidentalis*) foliis lobatis. Hort. Cliff. 447. *Plane-tree with lobated leaves.* Platanus Occidentalis aut Virginienfis. Park. Theat. 1427. *Occidental or Virginian Plane-tree.*

These two are undoubtedly distinct species, but there are two others in the English gardens, which I suppose to be varieties that have accidentally risen from seed; one is titled the Maple-leaved Plane-tree, and the other is called the Spanish Plane-tree.

The first sort, or Eastern Plane-tree, grows naturally in Asia, where it becomes very large; the stem is tall, erect, and covered with a smooth bark, which annually falls off; it sends out many side branches, which are generally a little crooked at their joints; the bark of the young branches is of a dark brown, inclining to a purple colour; they are garnished with leaves placed alternate; their foot-stalks are an inch and a half long; the leaves are seven inches long and eight broad, deeply cut into five segments, and the two outer are slightly cut again into two more; these segments have many acute indentures on their borders, and have each a strong midrib, with many lateral veins running to the sides; the upper side of the leaves are of a deep green, and the under side pale. The flowers come out upon long foot-stalks or ropes hanging downward, each sustaining five or six round balls of flowers; the upper, which are the largest, are more than four inches in circumference; these sit very close to the foot-stalks. The flowers are so small as scarce to be distinguished without glasses; they come out a little before the leaves, which is in the beginning of June; and in warm summers the seeds will ripen late in autumn, and if left upon the trees will remain till spring, when the balls fall to pieces, and the bristly down which surrounds the seeds, help to transport them to a great distance with the wind. The second sort grows naturally in most parts of North America; this tree also grows to a large size, the stem very strait, and of equal girt most part of the length; the bark is smooth, and annually falls off like that of the other; the branches extend wide on every side; the young ones have a brownish bark, but the old ones have a gray bark; the foot-stalks of the leaves are three inches long; the leaves are seven inches long, and ten broad; they are cut into three lobes or angles, and have several acute indentures on their borders, with three longitudinal midribs, and many strong lateral veins. The leaves are of a light green on their upper side, and paler on their under. The flowers grow in round balls like the former, but are smaller. The leaves and flowers come out at the same time with the former, and the seeds ripen in autumn.

That which is called the Maple-leaved Plane, is certainly a seminal variety of the Eastern Plane, for the seeds which scattered from a large tree of this kind in the Chelsea Garden have produced plants of that sort several times. This differs from the two sorts before-mentioned, in having its leaves not so deeply cut as those of the Eastern Plane, but they are divided into five segments, pretty deep, but are not lobed as those of the Occidental Plane. The foot-stalks of the leaves are much longer than those of either of the former, and the upper surface of the leaves is rougher, so that any person might take them

for different species, who had not seen them rise from the same seeds.

The Spanish Plane-tree has larger leaves than either of the other sorts, which are more divided than those of the Occidental Plane-tree, but not so much as the Eastern. Some of the leaves are cut into five and others but three lobes; these are sharply indented on the edges, and are of a light green; the foot-stalks are short, and covered with a short down. This is by some called the middle Plane-tree, from its leaves being shaped between those of the two other sorts. It grows rather faster than either of the other sorts, but I have not seen any very large trees of this kind.

The first sort was brought out of the Levant to Rome, where it was cultivated with much cost and industry. The greatest orators and statesmen among the Romans took great pleasure in their villas, which were surrounded with Platani; and their fondness for this tree became so great, that we frequently read of their irrigating them with wine instead of water. Pliny affirms, that there is no tree whatsoever, which so well defends us from the heat of the sun in summer, nor that admits it more kindly in winter, the branches being produced at a proportionable distance to the largeness of their leaves (which is what holds through all the different sorts of trees yet known) so that when the leaves are fallen in winter, the branches growing at a great distance, easily admit the rays of the sun.

This tree was afterwards brought to France, where it was cultivated only by persons of the first rank; and so much was the shade of it prized, as that if any of the natives did but put his head under it, they exacted a tribute from him.

It is generally supposed, that the introduction of this tree into England is owing to the great Lord Chancellor Bacon, who planted a noble parcel of them at Verulam, which were there very flourishing some years since, but have lately been destroyed. But notwithstanding its having been so long in England, yet there are but very few large trees to be seen of it at present; which may, perhaps, be owing to the great esteem the persons of the last age had for the Lime-tree, which was a fashionable tree at that time, and being much easier to propagate, and of a quicker growth during the three or four first years than the Plane-tree, thereby it became the most common tree for planting of avenues and shady walks near habitations in England. But since the defects of that tree have been more generally discovered, the Elm has had the preference, and is now the most commonly planted for such purposes.

However, notwithstanding what has been said of the Plane-tree, of its backwardness in coming out in the spring, and the sudden decay of its leaves in autumn, yet for the goodly appearance, and great magnitude to which it will grow, it deserves a place in large plantations, or shady recesses near habitations; especially if the plantation be designed on a moist soil, or near rivulets of water, in which places this tree will arrive to a prodigious magnitude.

We read of one of these trees, which was growing at a villa of the Emperor Caligula, whose trunk was so large, as when hollowed, to make room therein, capacious enough to entertain ten or twelve persons at a repast, and for their servants to wait upon them. And there is mention made of one of these trees, which was growing in the Eastern country, which was of so great a magnitude, that Xerxes made his army (which consisted of seventeen hundred thousand men) halt for some days, to admire the beauty and tallness of this tree; and became so fond of it, as to take his own, his concubines, and all the great persons jewels to cover it; and was so much enamoured with it, that for some days, neither the concern of his grand expedition, nor interest, nor honour, the necessary motion of his prodigious army, could dissuade him from it; he stiled it, his Mistress, his Minion, his Goddess; and when he was obliged to part with it, he caused a figure of it to be stamped

stamped on a gold medal, which he continually wore about him.

And such was the esteem which the people of Asia had for this tree, that wherever they erected any sumptuous buildings, the porticoes, which opened to the air, terminated in groves of these trees.

The Eastern Plane-tree is propagated either from seeds, or by layers, the latter of which is generally practised in England; though the plants thus raised seldom make so large strait trees, as those which are produced from seeds; but it has been generally thought, that the seeds of this tree were not productive, because they have not been sown at a proper season, nor managed in a right manner; for I have had thousands of the young plants spring up from the seeds of a large tree, which scattered upon the ground in a moist place; and I since find, that if these seeds are sown soon after they are ripe, in a moist shady situation, they will rise extremely well; and the plants thus obtained, will make a considerable progress after the second year, being much hardier and less liable to lose their tops in winter, than those which are propagated by layers. And since the seeds of this tree frequently ripen well in England, they may be propagated in as great plenty as any other forest-tree.

The Virginian Plane-tree will grow extremely well from cuttings, if they are planted the beginning of October upon a moist soil; and if they are watered in dry weather, will make a prodigious progress; so that in a few years from the planting, they will afford noble trees for planting of avenues, and other shady walks; and their trunks are perfectly strait, growing nearly of the same size to a considerable height, there being the least difference in the girth of this tree, for several yards upwards, of any other sort of tree whatsoever. The Hon. Paul Dudley, Esq; in a letter to the Royal Society, mentions one of these trees, which he observed in New England, whose girth was nine yards, and held its bigness a great way up, which tree, when cut down, made twenty-two cords of wood. He also says, in the same letter, That he had propagated many of these trees by cutting off sticks of five or six feet long, and setting them a foot deep into the ground in the spring of the year, when the season was wet, and that they always thrive best in a moist soil.

All the sorts are propagated very easily by layers, every twig of them will take root, if they are but pegged down and covered with earth; these layers will be well rooted in one year, when they should be cut off from the old trees or stools, and planted in a nursery, where they may remain two or three years to get strength, after which they may be transplanted where they are to remain, for the younger these trees are planted the better they will thrive. An experiment of this I made in 1731, when I planted four of these trees, one of each sort, in the same soil and situation, at about twenty feet distance from each other; one of which, viz. the Spanish Plane, whose stem was eight inches in girth; next to this, I planted one of the Maple-leaved Plane-tree, whose girth was not three inches, but the latter is now much larger than the former, and gains more in one year than the other does in three; and the two others which were of a middle size, have grown in a mean proportion between them.

PLOUGHING OF LAND.

There is not a greater improvement of arable land than that of well ploughing it, by which the soil is pulverized, and rendered fit to receive the fibres of the plants; and the oftener this is repeated, and the better it is performed, the greater improvement is made in the land. But there are not many of the practitioners of the art of husbandry, who attend enough to this part of it, most of them contenting themselves with going on in the old beaten road of their predecessors; so that the only persons who have made great improvement in this part of agriculture, are the great gardeners, who cultivate most of their land with the plough; therefore they have imitated, as near as possible, the use of the spade in labouring of their ground.

The difference between digging of land with the spade, and that of ploughing, consists in the parts of the earth being much more divided by the former, than the latter method; therefore those gardeners, who are curious in the working of their land, oblige their labourers to spit the ground as thin as possible, that there may remain no large clods unbroken; so, when land is ploughed, the same regard should be had to break and pulverize the parts as much as possible; for when there are great clods left unbroken, the fibres of plants never penetrate farther than the surface of them; so that all the salts included in these lumps of earth are locked up, that the plants can receive no benefit from them. And these clods, in proportion to their size, make such interstices, that the air often penetrates through, and greatly injures the tender fibres of the roots. Therefore the oftener the land is ploughed, and the more the parts are separated and pulverized, the better will the plants be nourished and fed; but particularly in all strong land, this part of husbandry will be the most beneficial; but this cannot be effected under four or five ploughings, and by using such ploughs as have either two or four coulter, which will cut and separate the clods much better than it can be performed by the common plough; and in the operation, great care should be had to the breadth of the furrow, for when these are made too broad, it will be impossible to break and separate the parts sufficiently. In some counties, where the husbandmen are not very expert in the use of the plough, I have seen gentlemen oblige them to plough by a line, and they have set out the exact width of each furrow. This not only adds a neatness to the ground, but likewise, by keeping the furrows strait, and at equal distances, the land will be more equally worked; but many of the good ploughmen in the counties near London, will direct the plough as strait by their eye, as if they were to use a line.

Another thing to be observed in ploughing of land is that of going to a proper depth, for if the surface only be broken up and pulverized, the roots of whatever plants are sown upon it will in a very short time reach the bottom, and meeting with the hard unbroken soil, they are stopped from getting farther, and of consequence the plants will stint in their growth; for there are few persons who have attended enough to the downright growth of the roots of plants, and only have had regard to the roots of those plants, which are of a strong fleshy substance, and are called tap-roots, being in form of Carrots. These they suppose will require to have the land wrought to a greater depth, that the roots may run down, and be the longer, for in that particular their goodness consists. But they do not think that the small fibrous-rooted plants ever require so much depth to run into the ground; in this they are greatly mistaken, for I have traced the small fibres of Grass and Corn above three feet deep in the ground. And if any person is curious to observe the length of the fibres of plants, if they will but plant one of each sort into a small pot of earth, and keep them duly watered till the plants are advanced to flower, and then turn them out of the pots carefully, so as not to break any of the fibres of the roots, and after separating the earth from them, measure the length of their roots, they will be found much greater than most people imagine. I have myself frequently traced the roots of plants, which have surrounded the pots upward of twelve times; and the roots of some strong-growing plants, which have gotten through the holes in the bottom of flower-pots, have in three months time extended themselves ten or eleven feet from the plant; therefore the deeper the ground is laboured, the greater benefit the plants will receive from it: but it must be understood of such land as the staple is deep enough to admit of this, for if the soil is shallow, and either gravel, chalk, or stone lie beneath, it will be very imprudent to turn up either of these; therefore the depth of the furrows in such lands, must be determined by the staple of the land. By the word staple must be understood all that

depth of soil next the surface, which is proper for the growth of vegetables. Where clay is next the staple, provided it is not of the blue or iron-mould sort, there will not be the same danger of going a little deeper than the staple, as in either of the before-mentioned sorts of land; for if the clay be of a fat nature, when it hath been well exposed to air, and often laboured, it will be capable of affording a large share of nourishment to the crops.

If between each ploughing of the land a harrow with long teeth is made use of to tear and break the clods, it will be of great service to the land; for the more it is stirred by different instruments, the better will the parts be separated and pulverized; so that the common method, as practised by the farmers, when they fallow their land, is far from answering the intention, for they plough up the ground, leaving it in great clods for some months, and frequently, during this time, Thistles and all bad weeds are suffered to grow upon the land, to exhaust the goodness of it; and perhaps, just before the seeds are sown, they give it two more ploughings. This is what the farmers call good husbandry; but if instead of this method they would labour the ground often with the plough, a harrow, and heavy roller, to break and separate the parts, and never suffer any weeds to grow upon the land during its lying fallow, I am sure they would find their account in it; first, by the growth and increase of their crops, and afterward by a saving in the weeding; for if no weeds are suffered to grow to shed their seeds, during the time of fallowing the land, there will but few come up when the ground is sown, in comparison with what would otherwise be in the common husbandry.

In many of the old gardens near London, which are occupied by the kitchen-gardeners, when the upper surface of the ground is exhausted by the continual crops which they get from it, it is a common method to trench the ground two or three spades depth, and turn the bottom soil upward; and by this the land is fresh, and produces very good crops for some years after. And in imitation of this many of the farming gardeners, who make use of the plough, have two or three men following the plough in the furrows, who turn up a spit in the bottom of each furrow; and where the soil is good, they throw it on the surface, but if otherwise, they level it in the bottom, and this loosening of the ground renders it capable of admitting the roots of the plants.

The ploughing already mentioned is intended to prepare the land for the reception of the seeds which are proposed to be sown, and as was before observed, the oftener and better this is performed, the more the land will produce. But, beside this, there will be a necessity for stirring the ground to destroy the weeds, after the crop is growing; for if the weeds are suffered to grow with the crop, they will draw away most of the nourishment, and greatly lessen their produce. Therefore in gardens this work is generally performed by hand, with an instrument called a hoe, unless when the ground is very stiff, and subject to bind; in which case it will be proper to make use of forks to break and loosen the earth between the crops, and the oftener this is repeated, the better will the crops succeed, and this husbandry I have seen attended with great advantage. But in the large open fields of Beans, Peas, and other large-growing plants which are planted in rows, the ground between may be frequently stirred with a small swing-plough, which will destroy the weeds, pulverize the ground, and give nourishment to the crop; for as all land is apt to bind, or the parts coalesce by lying unstirred, the more and oftener it is stirred, the better it will be kept loose, and thereby rendered proper for the growth of plants. This sort of ploughing is termed horse-hoeing, and there being a particular treatise upon this sort of husbandry written by Mr. Jethro Tull, of Shelbourn, in Berkshire, in which the instruments are figured and described, I shall refer those, who are desirous to practise this husbandry, to the book itself, and shall only take notice, that although the in-

strument used in this operation is a plough, yet it is termed hoeing, as it is intended to destroy the weeds, and to stir the ground but a small depth, to distinguish it from the common ploughing to prepare the land for the crop.

PLUMBAGO. Tourn. Inst. R. H. 140. tab. 58. Lin. Gen. Plant. 196. Leadwort.

The CHARACTERS are,

The flower has a tubulous, five-cornered, permanent empalement of one leaf, which is indented at the top into five parts; it hath one petal which is funnel-shaped, and a cylindrical tube which is narrow at the top. The brim is cut into five parts which are oval and spreading; it has five awl-shaped stamina situated in the tube, sitting upon the valves of the nectarium, which includes the germen. The small oval germen sustains a single style the length of the tube, crowned by a slender five-pointed stigma. The germen afterward becomes a single oval seed included in the empalement.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes the plants whose flowers have five stamina and one style.

The SPECIES are,

1. PLUMBAGO (*Europæa*) foliis amplexicaulibus. Hort. Cliff. 53. Leadwort with leaves embracing the stalks. Plumbago quorundam. Clus. Hist. 123. Leadwort or Toothwort.
2. PLUMBAGO (*Zeylanica*) foliis petiolatis ovatis glabris, caule geniculis gibbosis. Lin. Sp. 215. Hort. Cliff. 53. Leadwort with leaves having foot-stalks. Plumbago Americana, betæ folio ampliori. Plum. Cat. *American Leadwort with a larger Beet leaf.*

These are all the sorts which I have observed in the English gardens. The first sort grows naturally in the south of France, in Italy, and Spain; it hath a perennial root, which strikes deep into the ground, from which arise many slender stalks about three feet and a half high, which are channelled, and garnished with oval spear-shaped leaves about three inches long and two broad, whose base embrace the stalks; they are smooth, entire, and of a grayish colour. The upper part of the stalks send out many side branches which are slender, and garnished with small leaves. These, and also the principal stalks, are terminated by tufts of either blue or white flowers, which are small, funnel-shaped, and have pretty long tubes, and are succeeded by oblong, rough, hairy seeds. This plant seldom flowers till toward the end of October in England, and unless the autumn proves warm, does not flower here, so never produces ripe seeds. There is a variety of this with white flowers and pale stalks, which is supposed to have risen from the seeds of the former.

The stalks of this decay in the winter, and new ones come up the following spring; they are propagated here by parting of their roots, which send out heads in plenty. These may be divided at any time when the weather is mild, from the time the stalks decay, till the roots begin to shoot in the spring; it should have a light soil and a warm situation, otherwise it will not flower here. The roots should be allowed room to spread, and the stalks require support, and if the plants are kept clean from weeds, and the ground between them dug every winter, it is all the culture they require.

It is called Dentillaria or Toothwort by many authors, who recommend its virtues in curing the tooth-ach, being of a hot caustic nature like Pellitory of Spain.

The second sort grows naturally in both Indies; this is a perennial plant, with a strong fibrous root, from which arise many slender stalks, which grow near four feet high, garnished with smooth, oval, spear-shaped leaves about three inches long, and one and a half broad near their base, ending in acute points, which are placed alternate, standing upon short foot-stalks. The upper part of the stalks divide into small branches, garnished with small oval leaves, and terminate in spikes of flowers, which have long slender tubes, cut into five segments at the brim, which spread open; these are succeeded by oblong seeds covered with the prickly empalement. The upper part of the

the stalks, and the empalements of the flowers are very glutinous, sticking to the fingers if touched, and the small flies which settle upon them are fastened, so cannot get off again. This plant is too tender to thrive in the open air in England, so requires to be kept in a moderate stove, where they will continue flowering great part of the year; and those flowers which appear early in the summer, will be succeeded by ripe seeds in autumn.

This is propagated by seeds, which should be sown on a good hot-bed in the spring, where the plants will come up in about five or six weeks. When these are fit to remove, they should be each planted into a separate small pot filled with light loamy earth, and plunged into a hot-bed of tan, observing to screen them from the sun till they have taken new root; afterward they must be treated like other plants from the same country. In the summer they should have a large share of fresh air admitted to them in warm weather, and require water every other day in moderation. In winter they should be kept in a moderate temperature of warmth, and must be more sparingly watered. With this management the roots will abide several years, and produce plenty of flowers and seeds.

PLUM-TREE. See PRUNUS.

PLUMERIA. Tourn. Inst. R. H. 659. tab. 439. Lin. Gen. Plant. 263. Red Jasmine; in French, *Frangipanier*.

The CHARACTERS are,

The flower has a small obtuse empalement divided into five parts; it hath one funnel-shaped petal, with a long tube enlarging upward, cut into five oblong oval segments at the top, which spread open; it hath five awl-shaped stamina situated in the center of the tube, terminated by summits which close together, and an oblong bifid germen with scarce any style, crowned by a double acute stigma. The germen afterward becomes a long, swelling, acute-pointed capsule with one cell, filled with winged seeds placed over each other like scales of fish, fastened at their base to the sides of the capsule.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one style.

The SPECIES are,

1. PLUMERIA (*Rubra*) foliis ovato-oblongis, petiolis biglandulosis. Hort. Cliff. 76. *Plumeria with oblong oval leaves, whose foot-stalks have two glands. Plumeria flore roseo odoratissimo. Inst. R. H. 659. Plumeria with a Rose-coloured sweet-scented flower, commonly called in the West-Indies Red Jasmine.*
2. PLUMERIA (*Incarinata*) foliis ovato-oblongis, ramis patulis, floribus corymbosis. *Plumeria with oblong oval leaves, spreading branches, and flowers growing in a corymbus. Plumeria flore majore odorato & incarnato. Plumeria with a larger sweet-scented and incarnate flower, called in the West-Indies the Japan-tree.*
3. PLUMERIA (*Alba*) foliis lanceolatis revolutis, pedunculis supernè tuberosis. Lin. Sp. Plant. 410. *Plumeria with spear-shaped leaves which turn backward, whose foot-stalks have swellings on the upper side. Plumeria flore niveo, foliis longis angustis & acuminatis. Inst. R. H. Plumeria with a snowy flower, and long narrow-pointed leaves.*
4. PLUMERIA (*Nivea*) foliis lanceolatis petiolatis obtusis. Lin. Sp. Plant. 210. *Plumeria with spear-shaped obtuse leaves having foot-stalks. Plumeria flore niveo, foliis brevioribus & obtusis. Inst. R. H. Plumeria with a snowy flower, and shorter blunt leaves.*
5. PLUMERIA (*Africana*) foliis lineari-lanceolatis longissimis. *Plumeria with very long, narrow, spear-shaped leaves.*

The title of this genus was given to it by Dr. Tournefort, in honour of Father Plumer, who was botanist to the late King of France, and a long time in America searching after new plants; and has published a catalogue of the plants he discovered, with several new genera which he constituted, in two volumes in folio, with figures and descriptions of many of the plants.

The first sort grows naturally in the Spanish West-Indies, from whence it was transplanted into most of the islands in the West-Indies, where it is cultivated in the gardens for ornament. It rises to the height of eighteen or twenty feet; the stalk is covered with a dark green bark, having marks where the leaves are fallen off. The stalks are succulent, and abound with a milky juice, but within they are somewhat ligneous. Toward the top they put out a few thick succulent branches, which are garnished at their ends with oval oblong leaves of a light green colour, having a large midrib and many transverse veins; these are full of a milky juice. At the ends of the branches come out the flowers in clusters; they are shaped like those of the Oleander or Rose Bay, having one petal which is tubulous, and cut into five oval obtuse segments which spread open, of a pale red colour, and have an agreeable odour. When the flowers are past, the germen becomes a long swelling pod filled with flat winged seeds, lying over each other like the scales of fish. It usually flowers here in July and August, but is never succeeded by pods in England.

The second sort I received from the island of St. Christopher's by the name of Japan-tree; this sort is very rare in the English settlements at present, having been but lately introduced from the Spanish West-Indies. It is in leaf and stem very like the first, but the stalks do not rise so high; they divide into strong spreading branches, which are filled with a milky juice; the leaves are of a thicker consistence than those of the first, and their veins are larger; the flowers of this are of a paler colour, and are produced in much larger clusters. It is very common to have upward of twenty of these flowers open in one bunch, and a number to succeed these as they decay, so that the clusters have continued in beauty upward of two months, during which time they make a most beautiful appearance in the stove, and have a very agreeable flavour.

The third sort grows plentifully at Campeachy, from whence the late Dr. Houstoun sent the seeds. He also observed some plants of this kind at Jamaica. This is not near so beautiful as the two former sorts, the flowers being smaller, and produced in less bunches, and are moreover of short duration. But for the beauty of their stems and leaves, and for the sake of variety, they deserve room in every curious collection of plants.

The fourth sort was discovered by Dr. Houstoun, growing in great plenty near Carthagen in the Spanish West-Indies, from whence he sent the seeds to England. This sort produces small white flowers, resembling those of the third, so is less valuable than the two first.

The seeds of the fifth sort were sent me by Mr. Richard, gardener to the King of France at Versailles; they were brought from Senegal by Monsieur Adanson, who was some years in that country in search of plants. This hath a stalk very like the first sort, but the leaves are nine or ten inches long, and not more than two inches broad; they are thick, succulent, and full of a milky juice, a little roundish at their base, but end in acute points. The flowers of this sort are said to be yellow, but as the plants have not yet flowered here, I can give no farther account of them.

All these plants may be propagated by seeds, which must be procured from the countries where they naturally grow; they should be sown in pots filled with light earth, and plunged into a hot-bed of tanners bark; and when the plants are come up about two inches high, they should be transplanted into separate small pots filled with light sandy earth, and plunged into the hot-bed again, observing to shade them from the heat of the sun in the middle of the day, until they have taken root; but they must not have much water, for as all the sorts are very succulent, being full of a milky juice, somewhat like the Euphorbiums, moisture will cause them to rot. In hot weather the plants should have a pretty large share of fresh air admitted

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admitted to them, by raising the glasses of the hot-bed every day, in proportion to the warmth of the season, to prevent their drawing up weak. Toward Michaelmas, when the nights begin to be cold, the plants should be removed into the stove, and plunged into the bark-bed, where they must remain during the winter. As these plants all cast their leaves in the middle of winter, and continue destitute of them till about the beginning of May, so during that time, they should be watered very sparingly, because they are in more danger of rotting, while they are in a less active state, by too much moisture, than when they are furnished with leaves, through which the moisture is more freely perspired.

All these sorts are too tender to thrive in the open air of this country in the summer season, therefore should be constantly preserved in the stove, where, in warm weather, they must have a large share of free air, but in cold weather they must be kept very warm. While they are young, it will be proper to continue them in the bark-bed; but when they have obtained strength, they may be placed in a dry stove, where they will thrive well, provided they are kept in a moderate temperature of heat, and have not too much water.

These plants may also be propagated by cuttings, which should be taken from the old plants two months before they are planted, during which time they should be laid on the flues in the stove, that the part which joined to the old plant may be healed over before they are planted, otherwise they will rot. These cuttings should be planted in small pots filled with light sandy earth, and plunged into a moderate hot-bed of tanners bark, observing to shade them in the heat of the day from the sun, and refresh them once in a week or ten days with water, but it must be given to them sparingly each time. If the cuttings succeed, they will have taken root in about two months, when they should have a larger share of air to harden them by degrees to bear the sun and air, and afterward may be treated as the old plants.

The milky juice of these plants is very caustic, and reckoned poisonous. In cutting off any of the branches of the plants, if the knife be not immediately cleaned, the juice will corrode it, and turn the blade almost black in a very little time, so as not to be cleaned off again; and if dropped on linen will cause it to wash in holes, equal to aquafortis.

PODOPHYLLUM. Lin. Gen. Plant. 571. Anapodophyllum. Tourn. Inst. R. H. 239. tab. 122. Duck's-foot, or May Apple.

The CHARACTERS are,

The bud of the flower is inclosed in a large, three-leaved, coloured empalement in form of a spathe or sheath. The flower has nine roundish concave petals which are plaited on their borders, smaller than the empalement; it has a roundish germen without a style, crowned by a plaited obtuse stigma. The germen afterward turns to an oval capsule of one cell, crowned by the stigma, filled with roundish seeds.

This genus of plants is ranged in the first section of Linnæus's thirteenth class, which includes those plants whose flowers have many stamina and one style.

We have but one SPECIES of this genus at present in the English gardens, viz.

PODOPHYLLUM (*Peltatum*) foliis peltatis lobatis. Lin. Sp. Plant. 505. *Duck's-foot with target-shaped leaves having lobes.* Anapodophyllum Canadense Morini. Tourn. Inst. R. H. 219. *Canada Duck's-foot of Morinus.*

This plant grows naturally in many parts of North America. The root is composed of many thick tubers which are fastened together by fleshy fibres, which spread, and propagate greatly under ground, sending out many smaller fibres which strike downward. In the spring arise several foot-stalks about six inches high, which divide into two smaller, each sustaining one leaf, composed of five, six, or seven lobes, the five middle being deeply indented at the top; these join together at their base, where the foot-stalk meets,

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which is fastened to the under side of the leaf like the handle of a target; the leaves are smooth, and of a light green. At the division of the foot-stalk comes out the flower, with a large empalement covering it like a sheath; the flower hath nine pretty large concave white petals, which are roundish at the top, and plaited on their borders. In the center is situated a large, roundish, oval germen, crowned by a plaited obtuse stigma, and surrounded by a great number of short stamina, terminated by oblong, erect, yellow summits. The flowers appear in May, and when they fall off, the germen swells to a fruit of the size and shape of the common Hip or fruit of the wild Rose. This is at first green, but when ripe changes to a yellow colour, inclosing several roundish seeds fastened to the placenta.

This plant propagates so fast by its creeping roots, as that few persons are at the trouble of sowing the seeds. Every part of the root will grow, so they may be annually parted, either in autumn when their leaves decay, or in the spring just before the roots begin to shoot; they require no other culture but to keep them clean from weeds. It loves a light loamy soil and a shady situation, and is so hardy as seldom to be injured by the frost.

POINCIANA. Tourn. Inst. R. H. 619. tab. 391. Lin. Gen. Plant. 462. Barbadoes Flower-fence, or Spanish Carnations; in French, *Poincillade*.

The CHARACTERS are,

The empalement of the flower is composed of five oblong concave leaves which fall off. The flower has five unequal petals; four of them are nearly equal and roundish, but the fifth is larger, deformed, and indented. It hath ten long, bristly, rising stamina, terminated by oblong summits, and an awl-shaped declining germen which sits upon the style the length of the stamina, and is crowned by an acute stigma. The germen afterward becomes an oblong compressed pod, with several transverse partitions; in each of these is lodged a single flattish seed.

This genus of plants is ranged in the first section of Linnæus's tenth class, which contains those plants whose flowers have ten stamina and one style.

We have but one SPECIES of this genus in the English gardens, viz.

POINCIANA (*Pulcherrima*) aculeis geminis. Hort. Upsal. 101. *Flower-fence with double spines.* Poinciana flore pulcherrimo. Tourn. Inst. R. H. 619. *Poinciana with a most beautiful flower.*

There are two varieties of this which were discovered by the late Dr. Houstoun in the Spanish West-Indies. One of these hath a red, and the other a yellow flower; but as there appears to be no other difference in the plants from the common sort, they must be supposed only accidental variations which have risen from seeds.

This plant grows naturally in both Indies; it is planted in hedges to divide the lands in Barbadoes, from whence it had the title of Flower-fence; it is also called Spanish Carnations by some of the inhabitants of the British islands in the West-Indies. It rises with a strait stalk ten or twelve feet high, which is covered with a smooth gray bark, and is sometimes as thick as the small of a man's leg, dividing into several spreading branches at the top, which are armed at each joint with two short, strong, crooked spines, and are garnished with decompound winged leaves, each leaf being composed of six or eight pair of simple winged leaves, the lower pair being composed of four or five pair of lobes, the others gradually increasing in their number toward the top, where they decrease again, and are smaller. The lobes are three quarters of an inch long, and almost half an inch broad at their points, lessening gradually to their base; they are of a light green colour, and when bruised emit a strong odour.

The branches are terminated by loose spikes of flowers, which are sometimes formed into a kind of pyramid, and at others they are disposed more in form of an umbel. The foot-stalk of each flower is near three inches long; the flower is composed of five petals which

which are roundish at the top, but are contracted to narrow tails at their base; they spread open, and are beautifully variegated with a deep red or Orange colour, yellow, and some spots of green; they have a very agreeable odour. In the center of the flower is situated a slender style above three inches long, upon which the germen sits, and is accompanied by ten stamina nearly of the same length with the style, terminated by oblong summits. After the flower is past, the germen becomes a broad flat pod about three inches long, divided into three or four cells by transverse partitions, each including one flattish irregular seed. The leaves of this plant are used instead of Sena in the West-Indies to purge, and in Jamaica the plant is titled Sena.

Ligon says the seeds of this plant were first carried to Barbadoes from Cape Verd Islands, and the beauty of the flowers was such, that the inhabitants soon spread it over that island, and afterward it was transported into most of the neighbouring islands. This may have been so, but it is very certain that the plant grows naturally in Jamaica, where the late Dr. Houstoun found it in the woods at a great distance from any settlements. He also found it growing naturally at La Vera Cruz, and at Campeachy, where he also found the two varieties with red and yellow flowers. The only difference between these and the first sort being in the colour of their flowers, and their branches having fewer spines.

The seeds of this plant are annually brought over in plenty from the West-Indies, which, if sown upon a hot-bed, will rise easily. When the plants are come up, they should be transplanted each into a small pot, and plunged into a hot-bed of tanners bark, observing to shade them from the sun till they have taken root; after which you must give them air in proportion to the warmth of the season; they must be frequently refreshed with water in summer. When the plants have filled the pots with their roots, they should be shaken out, and placed into larger ones, that their roots may have room to spread. If care be taken to water and shift them as often as is necessary, they will grow to be three feet high the first season. At Michaelmas the pots should be plunged into a fresh hot-bed of tanners bark in the stove, which should be kept to the Ananas heat marked on the botanical thermometers, and frequently refreshed with water, but they must not have it in large quantities, which is very injurious to these plants at that season. The earth which these plants should be planted in, must be fresh, light, and sandy (but not over-rich,) in which they will stand the winter better than if planted in a stronger soil. When the plants are grown large, there must be great care taken when they are shifted into larger pots, not to suffer the ball of earth to fall from their roots; for when this happens, the plants seldom survive it.

These plants must constantly remain in the bark-stove, where in warm weather they should have a large share of air, but they must not be exposed to cold; they are very impatient of moisture in winter, and, if damp seizes their top, it very often kills the plants, or at least occasions the loss of their heads. With proper management they will grow much taller here than they usually do in Barbadoes, but their stems will not be larger than a man's finger, which is occasioned by their being drawn up by the glasses of the stove. I have had some of these plants near eighteen feet high in the Chelsea Garden, which have produced their beautiful flowers some years. These flowers have always appeared in December, but in the West-Indies I am informed they flower twice a year, at which times they make a most beautiful appearance.

POKE VIRGINIAN. See PHYTOLOGICA.

POLEMONIUM. Tourn. Inst. R. H. 146. tab. 61. Lin. Gen. Plant. 200. [so called, according to Pliny, from *πολεμῆν*, Gr. to wage war, on account of the contests which arose betwixt two princes, each assuming the honour of the discovery of it to himself.] Greek Valerian, or Jacob's Ladder.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, which is cut into five segments; it has one petal, of the wheel shape. The tube is very short; the upper part, which is divided, spreads open. It hath five slender stamina which are inserted in the valves of the tube; these are inclined, and are shorter than the petal, and are terminated by roundish summits. In the bottom of the tube is situated an acute oval germen, supporting a slender style which is equal with the petal, crowned by a revolving trifid stigma. The germen afterward turns to a three-cornered oval capsule having three cells, filled with irregular acute-pointed seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. POLEMONIUM (*Ceruleum*) calycibus corollæ tubo longioribus. Lin. Sp. Plant. 162. *Greek Valerian, with an empalement longer than the tube of the flower. Polemonium vulgare ceruleum. Tourn. Inst. R. H. 146. Common blue Greek Valerian.*
2. POLEMONIUM (*Reptans*) foliis pinnatis, radicibus reptatricibus. Flor. Virg. 22. *Greek Valerian, with winged leaves and a creeping root.*

The first sort grows naturally in many parts of Europe; it has been discovered growing wild in Carleton Beek, and about Malham Cove near Craven, in Yorkshire. Of this there are two or three varieties, one with a white, and the other a variegated flower, and another with variegated leaves.

This plant has winged leaves, which are composed of several pair of lobes placed alternately. The lower leaves have eleven or twelve pair, and are terminated by an odd one; these are broadest at their base, ending in points, and sit close to the midrib. The stalks rise near a foot and a half high; they are hollow, channelled, and are garnished with winged leaves of the same form with the lower, but decrease upward in their size, and are terminated by bunches of flowers which sit very close; they have each one petal, which has a short tube, cut into five roundish segments at the top; they are chiefly of a beautiful blue colour, and have each five stamina, which are terminated by yellow summits. These flowers appear the latter end of May, and are succeeded by oval acute-pointed capsules, with three cells filled with irregular seeds, which ripen in August.

These plants are easily propagated by sowing their seeds in the spring upon a bed of light earth, and when they are come up pretty strong, they should be pricked out into another bed of the same light earth about four or five inches asunder, observing to shade and water them until they have taken root; after which they will require no farther care, but to keep them clear from weeds until Michaelmas, at which time they must be transplanted into the borders of the flower-garden, where, being intermixed with different sorts of flowers, they will make a beautiful appearance.

This plant is not naturally of long duration, but by taking them up in autumn and parting of them, they may be continued some years; but as the seedling plants always flower much stronger than the offsets, few persons ever propagate them by slips.

The sort with white flowers will frequently arise from the seeds of the blue, as will also that with variegated flowers, but these may be continued by parting of their roots.

The sort with variegated leaves is preserved by parting of their roots, because the plants raised from seeds would be subject to degenerate and become plain. The best time to part them is about Michaelmas, that they may take good root before the cold weather prevents them. These should have a fresh light soil, but if it be too rich, their roots will rot in winter, or the stripes of the leaves will go off in the summer.

The second sort grows naturally in Virginia and other parts of North America. This hath creeping roots,

by which it multiplies very fast. The leaves have seldom more than three or four pair of lobes, which stand at a much greater distance from each other than those of the common sort; they are of a darker green. The lobes are narrow, and are placed alternately; the stalks rise nine or ten inches high, sending out branches their whole length. The flowers are produced in loose bunches, standing upon pretty long foot-stalks; they are smaller than those of the common sort, and are of a lighter blue colour.

This sort may be propagated by seeds in the same manner as the common sort, or by parting of their roots in autumn, and is equally hardy with the common sort.

POLIANTHES. Lin. Gen. Plant. 384. Hyacinthus. Tourn. Inst. R. H. 344. tab. 180. The Tuberoſe.

The CHARACTERS are,

The flower has no empalement; it has one petal which is funnel-shaped. The tube is oblong and incurved; the brim is cut into six oval segments which spread open. It hath six thick stamina situated in the chaps of the petal, terminated by linear summits, which are longer than the stamina. In the bottom of the tube is situated a roundish germen, supporting a slender style, crowned by a thick, trifid, honey-bearing stigma. The germen afterward turns to an obtuse, roundish, three-cornered capsule having three cells, which are filled with plain half-round seeds disposed in a double range.

This genus of plants is ranged in the first section of Linnæus's sixth class, which includes those plants whose flowers have six stamina and one style.

We have but one SPECIES of this genus, viz.

POLIANTHES (*Tuberoſa*) floribus alternis. Hort. Cliff. 127. *Polianthes with flowers placed alternately.* Hyacinthus Indicus tuberosus, flore Narcissi. C. B. P. 42. *Tuberous Indian Hyacinth, with a flower like Narcissus, commonly called Tuberoſe.*

The varieties of this are the Tuberoſe with a double flower, the striped-leaved Tuberoſe, and the Tuberoſe with a smaller flower; the last is mentioned by several authors as a distinct species, but is certainly a variety. Caspar Bauhin titles it Hyacinthus Indicus tuberosus, flore Hyacinthi orientalis. Pin. 47. i. e. Indian tuberous Hyacinth, with a flower like the Eastern Hyacinth. This sort is frequent in the south of France, from whence the roots have been often brought to England early in the spring, before those roots have arrived from Italy, which are annually imported; the stalks of this are weaker, and do not rise so high, and the flowers are smaller than those of the common Tuberoſe, but in other respects is the same.

The Tuberoſe grows naturally in India, from whence it was first brought to Europe, where it now thrives in the warmer parts, as well as in its native soil. The Genoese are the people who cultivate this plant, to furnish all the other countries where the roots cannot be propagated without great trouble and care, and from thence the roots are annually sent to England, Holland, and Germany. In most parts of Italy, Sicily, and Spain, the roots thrive and propagate without care, where they are once planted.

This plant has been long cultivated in the English gardens for the exceeding beauty and fragrancy of its flowers; the roots of this are annually brought from Genoa, by the persons who import Orange-trees; for as these roots are too tender to thrive in the full ground in England, so there are few persons who care to take the trouble of nursing up their offsets, till they become blowing roots, because it will be two or three years before they arrive to a proper size for producing flowers; and as they must be protected from the frost in winter, the trouble and expence of covers is greater than the roots are worth; for they are generally sold pretty reasonable, by those who import them from Italy.

The double flowering is a variety of the first, which was obtained from the seed by Mons. Le Cour, of Leyden in Holland, who for many years was so tenacious

of parting with any of the roots, even after he had propagated them in such plenty as to have more than he could plant, so he caused them to be cut in pieces, that he might have the vanity to boast of being the only person in Europe who was possessed of this flower; but of late years the roots have been spread into many parts, and as there is no other method to propagate this but by the offsets, most people who have had of this sort are careful to multiply and increase it; which is done by planting the offsets upon a moderate hot-bed early in March, and covering the bed in cold weather with mats or straw, and in summer they must have plenty of water in dry weather. In this bed the roots may remain till the leaves decay in autumn, but if there should happen any frost before that time, the bed should be covered to guard the roots from the frost, because if the frost enters so low as to reach the roots it will kill them; and if the leaves are injured by the frost, it will weaken the roots. Where there is due care taken to screen them from frost, and too much wet, it will be the best way to let the roots remain in the bed till the end of November or the beginning of December, provided hard frosts do not set in sooner; for the less time the roots are out of the ground, the stronger they will be, and the sooner they will flower; when the roots are taken up, they should be cleaned from the earth, and laid up in dry sand, where they may be secure from frost and wet; here they should remain until the season for planting them again; this same method should be practised by those who are desirous to cultivate the single sort in England, and also that with striped leaves must be propagated the same way.

I shall next give directions for the management of those roots, which are annually brought from Italy. And first, in the choice of the roots, those which are the largest and plumpest, if they are perfectly firm and sound, are the best; and the fewer offsets they have, the stronger they will flower; but the under part of the roots should be particularly examined, because it is there that they first decay; after the roots are chosen, before they are planted, the offsets should be taken off; for if these are left upon the roots, they will draw away part of the nourishment from the old root, whereby the flower-stems will be greatly weakened.

As these roots commonly arrive in England in the month of February or March, those who are desirous to have these early in flower, should make a moderate hot-bed soon after the roots arrive, which should have good rich earth laid upon the dung, about seven or eight inches deep; this bed should be covered with a frame, and when the bed is in a proper temperature for warmth, the roots should be planted at about six inches distance from each other every way. The upper part of the root should not be buried more than one inch in the ground; when the roots are planted, there should be but little water given them until they shoot above ground; for too much wet will rot them, when they are in an inactive state, but afterward they will require plenty of water, especially when the season is warm. When the flower-stems begin to appear, the bed should have a large share of air given to it, otherwise the stalks will draw up weak, and produce but few flowers; for the more air these plants enjoy in good weather, the stronger they will grow, and produce a greater number of flowers; therefore, toward the beginning of May, the frame may be quite taken off the bed, and hoops fastened over it, to support a covering of mats, which need not be laid over but in the night, or in very cold weather, so that by enjoying the free open air their stems will be large; and if they are well watered in dry weather, their flowers will be large, and a great number on each stem.

This first planting will require more care than those which are designed to come after them, for in order to have a succession of these flowers, the roots should be planted at three different times, viz. the first the beginning of March, the second the beginning of April,

April, and the third at the end of that month, or the beginning of May; but these beds will require a much less quantity of dung than the first, especially that bed which is the last made; for if there is but warmth enough to put the roots in motion, it is as much as will be required; and this last bed will need no covering, for many times those roots which are planted in the full ground at this season, will produce strong flowers in autumn; but in order to secure their flowering, it is always the best way to plant them on a gentle hot-bed. As to the second bed, that should be arched over with hoops, and covered with mats every night, and in bad weather, otherwise the late frosts which frequently happen in May will pinch them.

These plants may remain in the beds until the flowers are near expanding, at which time they may be carefully taken up, preserving the earth to their roots, and planted in pots, and then placed in the shade for about a week to recover their removal; after which time the pots may be removed into halls or other apartments, where they will continue in beauty a long time, and their fragrant odour will perfume the air of the rooms where they are placed; and by having a succession of them, they may be continued from Midsummer to the end of October, or middle of November; but as the stems of these plants advance, there should be some sticks put down by each root, to which the stems should be fastened, to prevent their being broken by the wind.

It is a common practice with many people, to plant these roots in pots, and plunge the pots into a hot-bed; but there is much more trouble in raising them in this method, than in that before directed; for if the roots are not planted in very small pots, there will be a necessity of making the beds much larger, in order to contain a quantity of the roots; and if they are first planted in small pots, they should be shaken out of these into pots of a larger size, when they begin to shoot out their flower-stems, otherwise the stalks will be weak, and produce but few flowers; therefore I prefer the other method, as there is no danger in removing the roots if it is done with care.

When the roots are strong and properly managed, the stems will rise three or four feet high, and each stem will produce ten or twelve flowers or more; and in this the great beauty of these flowers consists, for when there are but a few flowers upon the stalks they will soon fade away, so their places must be frequently renewed; for the flowers are produced in spikes coming out alternately upon the stalk, the lower flowers opening first; and as these decay, those above them open, so that in proportion to the number of flowers upon each stalk, they continue in beauty a longer or shorter time.

The sort with double flowers will require a little more care, in order to have the flowers fair; but this care is chiefly at the time of blowing, for the flowers of this sort will not open, if they are exposed to the open air; therefore when the flowers are fully formed and near opening, the pots should be placed in an airy glass-case, or a shelter of glasses should be prepared for them, that the dews and rains may not fall upon them, for that will cause the flowers to rot away before they open, and the heat of the sun drawn through the glasses will cause their flowers to expand very fair. With this management, I have had this sort with very double flowers extremely fair, and upward of twenty upon one stem, so that they have made a beautiful appearance; but where this has not been practised, I have rarely seen one of them in any beauty.

POLIUM. Tourn. Inst. R. H. 206. tab. 97. Teucrium. Lin. Gen. Plant. 625. Mountain Poley.

The CHARACTERS are,

The empalement of the flower is permanent, of one leaf, cut into five acute segments. The flower is of the lip kind; it hath one petal, with a short tube. The stamina occupy the place of the upper lip, and the lower lip is cut into five segments. It hath four awl-shaped stamina, which

are terminated by small summits, and a germen divided into four parts, supporting a slender style, crowned by two narrow stigmas; the germen afterward become four naked seeds, inclosed in the empalement.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, who has joined this genus, and also the Chamædryas and Chamæpitys of Tournefort to the Teucrium, making them but one genus, which includes those plants whose flowers have two long and two shorter stamina, and are succeeded by four seeds in the calyx.

The SPECIES are,

1. **POLIUM** (*Montanum*) foliis lanceolatis integerrimis, caulibus procumbentibus, floribus corymbosis terminalibus. *Mountain Poley with entire spear-shaped leaves, trailing stalks, and flowers growing in a corymbus at the end of the branches.* Polium lavendulæ folio. C. B. P. 220. *Mountain Poley with a Lavender leaf.*
2. **POLIUM** (*Luteum*) spicis oblongis foliis obtusis crenatis tomentosis. *Mountain Poley with oblong spikes of flowers, and obtuse, crenated, woolly leaves.* Polium montanum luteum. C. B. P. 220. *Yellow Mountain Poley.*
3. **POLIUM** (*Angustifolium*) spicis subrotundis, caulibus suffruticosis incanis, foliis linearibus tomentosis. *Mountain Poley with roundish spikes of flowers, hoary shrubby stalks, and very narrow woolly leaves.* Polium luteum angustifolium. C. B. P. 220. *Narrow-leaved yellow Mountain Poley.*
4. **POLIUM** (*Album*) caule ramoso procumbente, foliis lineari-lanceolatis dentatis, floribus corymbosis terminalibus. *Poley with a branching trailing stalk, narrow, spear-shaped, woolly, indented leaves, and flowers growing in a corymbus terminating the branches.* Polium montanum album. C. B. P. 221. *White Mountain Poley.*
5. **POLIUM** (*Capitatum*) caule erecto diffuso, foliis lineari-lanceolatis crenatis, corymbis terminalibus lateralibusque. *Poley with an erect diffused stalk, narrow, spear-shaped, crenated leaves, and flowers growing in a corymbus, terminating and proceeding out of the sides of the branches.* Polium maritimum erectum Monspeliacum. C. B. P. 221. *Upright maritime Poley of Montpellier.*
6. **POLIUM** (*Pyreniacum*) caulibus procumbentibus hirsutissimis, foliis cuneiformi-orbiculatis crenatis. *Poley with very hairy trailing stalks, and orbicular wedge-shaped leaves which are crenated.* Polium Pyreniacum supinum, hederæ terrestris folio. Tourn. Inst. R. H. 206. *Low Pyrenean Poley, with a leaf like that of Ground-ivy.*
7. **POLIUM** (*Latifolium*) caule erecto ramoso, foliis lanceolatis dentatis subtus tomentosis, floribus confertis terminalibus. *Poley with an upright branching stalk, spear-shaped indented leaves which are woolly on their under side, and flowers growing in clusters terminating the branches.* Polium montanum album ferratum, latifolium, erectum majus. Barrel. Obs. 34. *Greater upright white Mountain Poley, with a broad sawed leaf.*
8. **POLIUM** (*Erectum*) caule erecto corymbofo, foliis linearibus reflexis, floribus terminalibus. *Poley with an upright stalk branching out in form of a corymbus, narrow reflexed leaves, and flowers terminating the stalks.* Polium montanum album angustifolium. C. B. P. 221. *Narrow-leaved white Mountain Poley.*
9. **POLIUM** (*Ramosum*) caule ramoso, procumbente, foliis lineari-lanceolatis supernè dentatis, spicis oblongis terminalibus. *Poley with a trailing branching stalk, narrow spear-shaped leaves which are indented toward the top, and oblong spikes of flowers terminating the stalks.* Polium Hispanicum supinum, flore flavescens. Tourn. Inst. 207. *Low Spanish Poley with a yellowish flower.*
10. **POLIUM** (*Spicatum*) caule erecto suffruticoso, foliis linearibus confertis, spicis cylindricis fastigiatis terminalibus. *Poley with an upright under shrub stalk, narrow leaves growing in clusters, and cylindrical spikes of flowers which terminate the stalks.* Polium erectum album, angustiori folio & spicâ. Phil. Transf. 417. *Upright white Poley with a narrower leaf and spike.*

11. **POLIUM**

11. *POLIUM* (*Fruticosum*) caule erecto fruticoso, foliis lanceolatis tomentosis integerrimis, corymbis terminalibus. *Poley with an upright shrubby stalk, spear-shaped woolly leaves which are entire, and flowers growing in a corymbus terminating the stalks.* *Polium Valentinum fruticosum, angustifolium, flore albo.* Barr. Icon. 1048. *Shrubby narrow-leaved Poley of Valentia, with a white flower.*
12. *POLIUM* (*Serratium*) caule procumbente, foliis linearibus serratis, corymbis confertis terminalibus. *Poley with a trailing stalk, narrow sawed leaves, and clustered flowers growing in a corymbus at the ends of the stalks.* *Polium montanum album, angustifolium serratum, lupinum minus.* Barrel. Icon. 1091. *Low, smaller, white Mountain Poley, with a narrow sawed leaf.*
13. *POLIUM* (*Diffusum*) caule diffuso procumbente, foliis linearibus dentatis tomentosis, spicis subrotundis. *Poley with a trailing diffused stalk, narrow, indented, woolly leaves, and roundish spikes of flowers.* *Polium montanum luteum, ferratis angustioribus incanis foliis.* Barrel. Icon. 1089. *Yellow Mountain Poley, with narrower, hoary, sawed leaves.*
14. *POLIUM* (*Integerrimum*) caule erecto suffruticoso, foliis lanceolatis integerrimis, corymbis confertis terminalibus. *Poley with an erect shrubby stalk, spear-shaped entire leaves, and clustered flowers growing in a corymbus at the ends of the branches.*
15. *POLIUM* (*Smyrnum*) caule diffuso, foliis linearibus pinnato-dentatis, spicis subrotundis lateralibus. *Poley with a diffused stalk, linear, winged, indented leaves, and roundish spikes of flowers proceeding from the sides of the stalks.* *Polium Smyrnum scordii folio.* Tourn. Cor. 14. *Poley of Smyrna, with a Water Germander leaf.*

The first sort grows naturally on the mountains about Basil and Geneva, as also in France. The root of this plant is composed of many ligneous fibres, which spread wide in the ground, from which arise several weak, trailing, ligneous stalks, eight or nine inches long, which send out many small branches, garnished with small spear-shaped leaves, of a deep green and entire; they are placed by pairs. The flowers are produced in a corymbus at the end of the branches; they are white, and shaped like those of the other species. These appear in June and July, but are seldom succeeded by seeds in England. There is another sort with much smaller leaves, which are hoary on their under side, but I am not certain if it is a distinct species.

The second sort grows naturally in Spain; the stalks of this are rather herbaceous, and trail upon the ground; they are about six inches long, hoary, and garnished with woolly leaves about half an inch long; some of them are wedge-shaped, others are oblong, ending in obtuse points, and are crenated toward their ends. The flowers are collected in oblong thick spikes at the end of the branches; they are of a deep yellow colour, and appear the beginning of June, but are seldom succeeded by seeds in this country.

The third sort grows naturally in Spain and Portugal; the stalks of this are ligneous, erect, and branching, covered with a hoary down; they rise six or eight inches high, and are garnished with linear woolly leaves about half an inch long, having sometimes two or three slight indentures on their edges. The flowers are collected in roundish spikes at the end of the branches; they are of a bright yellow, and have woolly empalements. These appear in June and July.

The fourth sort grows naturally in the south of France and in Italy; this hath a trailing branching stalk, which at the bottom is ligneous, but the branches are herbaceous and woolly; they are garnished with linear, spear-shaped, woolly leaves, indented on their edges. The flowers are produced in a corymbus at the end of the branches; they are small, white, and shaped like those of the other species. This flowers in June and July.

The fifth sort grows naturally near the sea, in the south of France and in Italy. This hath an erect branching stalk, which rises a foot high; the lower

part becomes ligneous, but the upper is herbaceous; the leaves are linear, spear-shaped, about an inch long, crenated on their edges, of a pretty thick consistence, and a little woolly. The flowers are collected in a corymbus at the end of the branches; they are white, and like those of the other species. This flowers in July and August.

The sixth sort grows naturally on the Pyrenean Mountains; this hath slender shrubby stalks, which trail close upon the ground; they have a purple bark, and covered with white hairs; the leaves are round at the top, but at their base are contracted in form of a wedge, and are crenated on their edges, so as to resemble at first sight the leaves of Ground-ivy, but they are hairy, and of a thicker consistence. The flowers are collected in round bunches at the end of the branches, one half of their petals are purple, and the other half white; they are larger than those of the other species, but are of the same form. It flowers great part of summer, but seldom produces seeds here.

The seventh sort grows naturally in Italy and Spain; this hath a ligneous, erect, branching stalk, which rises near a foot high; it is very hoary, and branches out toward the top; the leaves are spear-shaped, indented on their edges, and woolly on their under side. The flowers are white, small, and grow in clusters at the end of the branches. It flowers in June and July.

The eighth sort grows naturally in Spain and Italy; this rises with a shrubby stalk nine or ten inches high, branching out toward the top in form of a corymbus; the leaves are linear, and their edges are reflexed. The flowers are collected in roundish woolly heads at the end of the branches; they are white, and smaller than most of the other species. This flowers in June and July.

The ninth sort grows naturally in Spain; it hath a trailing branching stalk about six or eight inches long, which is ligneous at bottom, but upward is herbaceous and hoary; the leaves are linear, spear-shaped, and indented toward the ends. The flowers are collected in oblong spikes at the end of the branches; they are of a pale yellow colour, and shaped like those of the other species. This flowers great part of summer.

The tenth sort grows naturally in Sicily; this hath slender shrubby stalks, which rise a foot and a half high; they are smooth and white, sending out a few short branches toward the top, garnished with small linear leaves growing in clusters. The flowers are collected in long cylindrical spikes, which stand at the top of the stalks, and sometimes come out in bunches on the sides; these are small and white. It flowers in July and August.

The eleventh sort grows naturally in Valencia; this hath slender ligneous stalks near two feet high, which are hoary, and garnished with small, spear-shaped, entire leaves at intervals, standing in clusters; they are woolly, and sit close to the stalk; the upper part of the stalk divides into several slender foot-stalks, each sustaining a small corymbus of white flowers. The whole plant is very hoary, and has a strong aromatic odour; it flowers late in summer.

The twelfth sort grows naturally in the south of France and in Italy; this hath trailing ligneous stalks about a foot long, garnished with linear sawed leaves, which are hoary, and have smaller leaves coming out from the bosom of the other. The flowers are collected in a corymbus at the end of the branches; they are small and white. This flowers in June and July.

The thirteenth sort grows naturally in Spain and Italy; this hath diffused trailing stalks, which are very woolly, about six or seven inches long, garnished with narrow indented leaves, which are covered with a woolly down, and are terminated by roundish heads of flowers, which are yellow; the whole plant is very hoary. It flowers in July.

The fourteenth sort grows naturally in Spain; this hath erect branching stalks about six or eight inches high; the branches come out opposite the whole length of the stalk; they are garnished with small spear-shaped leaves, of a dark green colour on their upper

POLYGALA floribus imberbibus spicatis, caule erecto herbaceo simplicissimo, foliis lato-lanceolatis Acan.
Acad. p 2. 139.

Senega Rattle Snake Root



upper side, but hoary on their under; the stalks and branches are terminated by clusters of blue flowers, which are collected in roundish heads. This sort flowers in July and August.

The fifteenth sort grows naturally about Smyrna; this hath diffused stalks, which rise about a foot high; they are white, and closely garnished with linear leaves near two inches long, and about a quarter of an inch broad; they are indented regularly on their edges like those of Spleenwort, but the indentures are not deep; they are of a dark green on their upper side, but hoary on their under. The flowers are collected in roundish spikes, which terminate the branches, and also come out from their side; they are white, and shaped like those of the other species. It flowers in July and August.

There are several other species of this genus, which grow naturally in the warmer parts of Europe; but those which are here mentioned, are all that I have yet seen growing in the English gardens; therefore I have omitted the other, as I have had no opportunity to examine them myself.

All the sorts, except the first, are abiding plants; they may be propagated by seeds, which must be procured from the countries where they naturally grow, because they seldom perfect their seeds in England. These should be sown upon a bed of fresh light earth in the spring, and when the plants come up, they must be carefully kept clean from weeds; about the middle of July the plants will be fit to remove, when they may be carefully taken up, and part of them planted on a warm border of dry rubbishy soil, observing to shade them from the sun, and water them till they have taken new root; after which they will require no other culture but to keep them clean from weeds. My advising these and many other aromatic plants, which are natives of the warmer parts of Europe, to be planted in rubbish, is founded upon long experience of their abiding much longer, and resisting the cold of our winters much better, than when they are growing in better ground, where they grow much freer, are fuller of moisture, and therefore more liable to be killed by frost.

The other part of the plants may be planted in small pots, filled with fresh, light, undunged earth, and placed in the shade till they have taken new root; then they may be removed into an open situation, where they may remain till the beginning of November, when they should be placed under a common frame, to secure them from the frost in winter, which sometimes destroys these plants; by this method the species may be preserved.

These plants may be disposed in a garden, so as to afford pleasure, by mixing them with Marum, Mastich, and several other aromatic plants, upon the sloping sides of banks, which are exposed to the sun, or upon little hillocks raised in a sheltered situation, where, by the diversity of their hoary branches, being of various shapes, they will make a pretty appearance; and in such places they will resist the cold much better, than when they are planted in a good soil.

They may also be propagated by cuttings or slips, which should be planted the beginning of April, just before they shoot, upon a border exposed to the East; and if the season proves dry, they must be watered and shaded until they have taken root, and afterward they will require no other care but to keep them clean from weeds, and at Michaelmas the plants should be removed where they are designed to remain; but it will be proper to put a plant of each sort in pots, that they may be sheltered in winter to preserve the kinds. The fourth and fifth sorts are sometimes used in medicine.

POLYANTHUS. See PRIMULA.

POLYGALA. Tourn. Inst. R. H. 174. tab. 79. Lin. Gen. Plant. 761. [This plant is so called, of πολλή, much, and γάλα, milk, because if cattle are fed in marshes that produce this plant, they give a great quantity of milk; it is also called Ambarvalis, of Ambiendis Arvis, from lustrating the fields; because

the ancients used to crown virgins with the flowers of this plant, when they perambulated the fields, to implore fertility thereto; it is also called Amarella, because it has a bitter taste.] Milkwort.

The CHARACTERS are,

The flower has a small permanent empalement of three leaves, which are oval and acute; two of these are below the petals, and one is above. The flower is shaped like those of the butterfly kind, the number of petals is indeterminate. The wings are large, plain, and extend beyond the other petals; the standard is tubulous, short, and reflexed at the brim, where it is bifid. The keel is concave, compressed, and bellied toward the top. It hath eight stamina in two bodies, included in the keel, terminated by single summits; and an oblong germen supporting an erect style, terminated by a thick bifid stigma. The germen afterward becomes a heart-shaped capsule having two cells, each containing one seed.

This genus of plants is ranged in the second section of Linnæus's seventeenth class, which contains those plants whose flowers have eight stamina joined in two bodies.

The SPECIES are,

1. POLYGALA (*Vulgaris*) floribus cristatis racemosis, caulibus herbaceis simplicibus procumbentibus, foliis lineari-lanceolatis. Amœn. Acad. 2. p. 136. Milkwort with branching crested flowers, single, trailing, herbaceous stalks, and linear spear-shaped leaves. Polygala vulgaris. C. B. P. 215. Common Milkwort.
2. POLYGALA (*Monspeliaca*) floribus cristatis, racemosis, caule erecto, foliis lanceolato-linearibus acutis. Sauv. Monsp. 53. Milkwort with branching crested flowers, an erect stalk, and acute, spear-shaped, linear leaves. Polygala vulgaris coloris obsoleti, foliis angustissimis. J. B. 3. p. 338. Common Milkwort with a worn-out flower, and the narrowest leaves.
3. POLYGALA (*Myrtifolia*) floribus cristatis, carinâ lunulatâ, caule fruticoso, foliis lævibus oblongis obtusis. Amœn. Acad. 2. p. 138. Milkwort with crested flowers, a moon-shaped keel, and a shrubby stalk bearing oblong leaves, which end in obtuse points. Polygala frutescens, folio buxi, flore maximo. Tourn. Inst. 175. Shrubby Milkwort, with a Box-tree leaf and a large flower.
4. POLYGALA (*Chamæbuxus*) floribus imberbibus sparsis, carinæ apice subrotundo, caule fruticoso, foliis lanceolatis. Amœn. Acad. 2. p. 140. Milkwort with flowers growing thinly and without beards, the point of the keel roundish, a shrubby stalk, and spear-shaped leaves. Chamæbuxus flore coluteæ. C. B. P. 471. Low Box with a flower like Bladder Sena.
5. POLYGALA (*Senega*) floribus imberbibus spicatis, caule erecto herbaceo simplicissimo, foliis lato-lanceolatis. Amœn. Acad. 2. p. 139. Milkwort with spiked flowers having no beards, an erect, single, herbaceous stalk, and broad spear-shaped leaves. Polygala Virginiana, foliis oblongis, floribus in thyrsis candidis, radice alexipharmicâ. Edit. Prior. Milkwort of Virginia with oblong leaves, white flowers ranged in a loose spike, and an alexipharmic root, commonly called Senega Rattle Snakeroot.
6. POLYGALA (*Mariana*) floribus imberbibus, oblongo-capitatis, caule erecto ramosa, foliis linearibus. Milkwort with beardless flowers growing in oblong heads, an erect branching stalk, and linear leaves. Polygala Mariana, angustiori folio, flore purpureo. Pluk. Mantiss. 153. tab. 438. fig. 5. Maryland Milkwort with a narrower leaf and a purple flower.
7. POLYGALA (*Americana*) floribus cristatis, racemo terminali, caule erecto ramoso, foliis lanceolatis tomentosis. Milkwort with crested flowers, an erect branching stalk, terminated by a loose spike of flowers, and woolly spear-shaped leaves. Polygala Americana erecta, flore purpureo-cæruleo, folio molli incano. Houst. MSS. Upright American Milkwort, with a purplish blue flower and a soft hoary leaf.

There are several other species of this genus, some of which grow naturally in Europe, and others in America, but as they are seldom cultivated in gardens, it would be to little purpose to enumerate them here.

The first fort grows naturally in pastures, and upon heaths in many parts of England; of this there are three varieties, one with a blue, another with a purple, and a third with white flowers, which are frequently found intermixed; and there is another which is larger, and supposed to be a distinct species; but I rather believe this difference is owing to the soil in which they grow; for the large one is generally found growing in moist pastures, and the small one upon dry heaths. This hath a perennial root, from which come out three or four slender, trailing, herbaceous stalks, about six inches long, garnished with linear spear-shaped leaves, about half an inch long, and an eighth part of an inch broad in the middle, terminating in points at both ends. The flowers are produced at the top of the stalks, branching out; they are small, and of a blue, purple, or white colour, having two wings, a keel and standard like the butterfly flowers. These appear in June, and are succeeded by flattish heart-shaped capsules, divided into two cells, each containing one seed.

The second fort grows naturally upon sterile ground about Montpellier; this fort is annual; it rises with an upright stalk about six inches high, which is garnished with narrow leaves placed alternate, ending in acute points. The flowers are small, of a worn-out purple colour; the keel is bearded like the common fort. This flowers in July, and has seed-vessels like the first fort, but smaller; the seeds ripen in autumn.

These forts are very rarely admitted into gardens, nor do they thrive so well when sown or transplanted there, as in their natural situation. If these are cultivated, their seeds should be sown soon after they are ripe, otherwise they rarely grow.

The third fort grows naturally at the Cape of Good Hope; this hath a shrubby stalk, covered with a smooth brown bark, which rises four or five feet high, sending out several spreading branches toward the top, which are closely garnished with oblong, blunt-pointed, smooth leaves, about an inch long, and a quarter of an inch broad, of a lucid green, sitting close to the branches. The flowers are produced at the end of the branches; they are large, white on their outside, but of a bright purple within; the keel of the flower is hollowed like a half-moon, and is bearded; the wings are expanded wide, and the standard is incurved; this plant continueth flowering most part of summer. The flowers are succeeded by compressed heart-shaped seed-vessels, having two cells, each containing one hard, smooth, shining seed. This plant is propagated by seeds, which should be sown in small pots, filled with light loamy earth; soon after they are ripe, these pots may be placed where they may have the morning sun only till October, when they should be placed under a hot-bed frame, and plunged into old tanners bark, which has lost its heat, where they may be defended from frost during the winter, and in the spring the pots should be plunged into a moderate hot-bed, which will bring up the plants. When these appear, they should not be too tenderly treated, but must have a large share of free air admitted to them; when they are fit to transplant, they should be carefully shaken out of the pots, and separated, planting each into a small pot filled with soft loamy earth, and plunged into a very moderate hot-bed to forward their taking new root, observing to shade them from the sun, and gently refresh them with water as they may require it, but they must not have too much wet. When they are rooted, they must be gradually inured to the open air, and in June they may be placed abroad in a sheltered situation, where they may remain till the middle or latter end of October, according as the season proves favourable; then they must be removed into the green-house, and treated in the same way as Orange-trees, being careful not to give them too much wet during the winter season. In the summer they must be placed abroad with other green-house plants, where, by their long continuance in flower, they will make a fine appear-

ance. The management of this plant is nearly the same as for the Orange-tree.

The fourth fort grows naturally on the Alps, and also upon the mountains in Austria and Hungary; this rises with a slender, branching, ligneous stalk about a foot high, when it grows upon good ground, but on a rocky soil seldom more than half that height. The branches are closely garnished with stiff, smooth, spear-shaped leaves of a lucid green. From between the leaves, toward the top of the branches, the flowers come out upon very short foot-stalks; they are white on their outside, but within are of a purplish colour mixed with yellow, and have a grateful odour. These appear in May, and are succeeded by seed-vessels shaped like those of the former fort.

This plant is very difficult to cultivate in gardens, for it commonly grows out of the fissures of rocks, so cannot be easily transplanted, and the seeds are with difficulty obtained from abroad; nor do these vegetate till they have been a whole year in the ground, unless they are sown soon after they are ripe, when the plants will come up the spring following; when the plants first come up, they make very little progress here, and are as difficult to transplant as almost any plant at present known, which occasions its present scarcity in England.

The best method of cultivating this is by seeds, which should be procured as fresh as possible from the places of its natural growth, and sown in pots as soon as it arrives; the pots may be plunged into the ground, where they may have only the morning sun. If these are sown before Christmas, there will be a chance of the plants coming up the following spring; but those which are not sown till toward spring, will remain in the ground a year; therefore the pots should be plunged into the ground, where they may have but little sun the following summer, and in autumn they may be removed, and plunged into an old tan-bed under a hot-bed frame, where they may be protected from severe frost; for although this plant is a native of the Alps and other cold mountains, yet as the seeds will not be covered with snow here, as they are in their native soil and situation, they are frequently spoiled here by the inconstancy of the weather in England. When the plants come up, they should be placed in shade during summer; and in autumn they may be turned out of the pots, and planted in a border where they may have only the morning sun, for this plant will not thrive long in pots. If the winter proves very severe, it will be proper to cover the surface of the ground about their roots with mulch to keep out the frost. If the plants take root in the border, they should remain there undisturbed, and be only kept clean from weeds, for the ground about their roots should not be dug or dunged.

The fifth fort grows naturally in most parts of North America. This hath a perennial root composed of several fleshy fibres, from which arise three or four branching stalks, which grow erect, and are more than a foot high; these are garnished with spear-shaped leaves placed alternately. The flowers are produced in loose spikes at the end of the branches; they are small, white, and shaped like those of the common fort, but their keels have no beards. It flowers here in July, but the plants do not produce seeds here.

The root of this fort hath been long used by the Seneka Indians to cure the bite of the rattle-snake, which, if taken in time, is an infallible remedy. And of late years it has been used by the inhabitants of Virginia in many disorders, which are occasioned by a thick sily blood; so that the root of this plant, when its virtues are fully known, may become one of the most useful medicines yet discovered. The Seneka Indians use this root, which they powder, and generally carry about them when they travel in the woods, lest they should be bit by the rattle-snake; and whenever this happens, they take a quantity of the powder inwardly, and apply some of it to the part bitten, which is a sure remedy.

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The sixth sort grows naturally in Maryland; this hath a perennial root, from which arise two or three stalks about eight inches high, which divide into several erect branches, garnished with small linear leaves of a dark green colour. The flowers are collected into oblong heads at the end of the stalks; they are small, and of a purplish blue colour.

Both these sorts are difficult to obtain, for the seeds rarely succeed, so the best way is to procure their roots from America, and when they arrive plant them in a bed of light earth in a sheltered situation. In summer they must be kept clean from weeds, and if the surface of the ground about their roots is covered with old tanners bark, or any other kind of mulch in winter, to keep out the frost, it will be a secure method to preserve them.

The seventh sort was discovered by the late Dr. Houstoun growing naturally at La Vera Cruz: this hath a taper perennial root which runs deep in the ground, from which arise several slender branching stalks about six or seven inches high, garnished with downy spear-shaped leaves an inch long, and half an inch broad in the middle, drawing to a point at both ends. The flowers are produced in loose spikes at the end of the branches; they are larger than those of the common sort, and are of a bluish purple colour. The keel of the flower is bearded, as in the common sort.

This is too tender to live in the open air in England, and it is one of those plants which will not thrive in pots, so is difficult to preserve here. It is propagated by seeds, which must be procured from abroad. The seeds, which I received from Dr. Houstoun, remained a year in the ground before the plants appeared, and the plants lived one year; but when their roots reached the bottom of the pots, they decayed; and those which were transplanted into larger pots did not survive their removal, though it was performed with great care.

POLYGONATUM. See CONVALLARIA.

POLYMNIA. Lin. Gen. 987. Hard-seeded Chrysanthemum.

The CHARACTERS are,

The flower hath a double empalement; the outer is composed of five large spreading leaves, the inner of ten erect spear-shaped leaves; it hath a radiated flower, whose disk is composed of hermaphrodite florets, and the border, or rays, of five female half florets, which are tongue-shaped and trifid. The hermaphrodite florets are funnel-shaped, have each five stamina terminated by cylindrical summits, which are longer than the petals; they have a small germen, supporting a slender style, crowned by an obtuse stigma; these are barren. The female half florets have a large germen, with a slender style the length of the tube, crowned by two pointed stigmas; these have each one oval gibbous seed lodged in the scaly receptacle, succeeding them.

This genus of plants is ranged in the fourth section of Linnæus's nineteenth class, intitled Syngenesia Polygamia necessaria, the plants having hermaphrodite and female florets; the former having five stamina whose summits are connected, the latter are fruitful.

The SPECIES are,

1. **POLYMNIA** (*Uvedalia*) foliis oppositis hastato-sinuatis. Lin. Sp. 1303. Hard-seeded Chrysanthemum, with sinuated leaves placed opposite. Chrysanthemum angulosifolium Virginianum. Pluk. Phyt. tab. 83. f. 3.
2. **POLYMNIA** (*Canadensis*) foliis alternis hastato-sinuatis. Lin. Sp. 1303. Hard-seeded Chrysanthemum, with sinuated leaves placed alternate.

The first sort grows naturally in Virginia, from whence I have received the seeds; this hath a perennial root, which runs deep in the ground, sending up in the spring many stalks in proportion to their size; these in moist good ground will rise near ten feet high, and are garnished with large, angular, sinuated leaves eight or ten inches over, of a light green, placed opposite; the stalks are terminated by a cluster of yellow flowers sitting close, having very short foot-stalks; each having five female half florets in their borders,

and several hermaphrodite florets in their middle, which are encompassed by a double empalement; the outer having five spreading leaves, the inner ten erect ones; the flowers appear in October, which is too late to be succeeded by seeds in England; the stalks decay in winter, and new ones arise in the spring.

The second sort grows naturally in several parts of North America; this has also an abiding root, which sends up many tall stalks in the spring, which rise almost as high as those of the other sort; these are garnished with large, angular, sinuated leaves, of a deeper green than those of the former, which are placed alternately; the flowers are of a paler yellow colour, and sit close on the top of the stalks; these appear late in the autumn, so are not succeeded by seeds in England.

These plants are both propagated by seeds, which must be procured from the countries where the plants grow naturally, so that the seeds seldom arrive here till toward the spring; and being sown at that season, the plants seldom come up until the following spring; whereas, if the seeds could be obtained in November, and were immediately sown, the plants would appear the following spring, whereby a year would be saved. The seeds should be sown in a bed of light ground in the open air; and when the plants come up, they should be thinned if they are too close, and kept clean from weeds till the following autumn, when the roots should be carefully taken up, and transplanted to the places where they are to remain, allowing each plant at least three feet room to grow, observing to keep them clean from weeds, and to dig the ground about them every spring.

POLYPODIUM. Tourn Inst. R. H. 540. tab. 316. Lin. Gen. Plant. [of πολλοί many, and πούς a foot, q. d. many feet. This kind of plant strikes its roots into every part it can lay hold of, whether it be stone, earth, or tree, it is the same thing, especially if it be a tree of the Oak kind.] Polypody.

The CHARACTERS are,

This is one of the Fern tribe, which is distinguished from the others, by the fructification being in roundish spots, distributed on the under surface of the leaf.

It is ranged in the first section of Tournefort's sixteenth class, which includes the herbs, which have no visible flower, whose fruit is fastened on the leaves.

The SPECIES are,

1. **POLYPODIUM** (*Vulgare*) frondibus pinnatifidis, pinnis oblongis subserratis obtusis, radice squamata. Lin. Sp. Plant. 1085. Polypody with wing-pointed leaves having oblong obtuse lobes, which are somewhat sawed, and a scaly root. Polypodium vulgare. C. B. P. 359. Common Polypody.
2. **POLYPODIUM** (*Cambricum*) frondibus pinnatifidis, pinnis lanceolatis lacero-pinnatifidis serratis. Lin. Sp. Plant. 1086. Polypody with wing-pointed leaves, whose lobes are spear-shaped, and the jags wing-pointed and sawed. Polypodium Cambro-Britannicum, pinnulis ad margines laciniatis. Raii Syn. Welsh Polypody with jagged leaves.

There are many other species of this plant which are natives of America, some of which are preserved in the curious botanic gardens for variety; but as they are rarely cultivated in other gardens, it may not be thought necessary to enumerate them in this place.

The first sort is that which is used in medicine, and is found growing upon old walls and shady banks in divers parts of England. The second sort was brought from Wales, where it grows in great plenty, and is the most beautiful of all the sorts. These plants may be propagated by parting of their roots in the spring before they shoot, and should be planted in a very poor moist soil under the shade of a wall; for if they are exposed to the sun, they will not thrive. They chiefly delight to grow out of the joints of walls and old buildings, but are commonly found exposed to the North.

POMGRANATE. See PUNICA.

POMUM ADAMI. See AURANTIUM.

PON-

PONTEDERIA. Lin. Gen. Plant. 391. Michelia. Houft. MSS.

The CHARACTERS are,

The flowers are included in an oblong sheath, which opens on one side, and hath six petals, which are divided; the three upper are erect, and form a kind of lip; the three under are reflexed. It hath six stamina which are inserted to the petals; the three which are longest, are fastened to the mouth of the tube, the other are inserted in the base; they are terminated by prostrate summits. Under the petals is situated an oblong germen, supporting a single style which declines, and is crowned by a single stigma. The germen afterward turns to a soft fruit divided into six cells, each containing several small roundish seeds.

This genus of plants is ranged in the first section of Linnæus's sixth class, which includes the plants whose flowers have six stamina and one style.

The SPECIES are,

1. **PONTEDERIA** (*Cordata*) foliis cordatis, floribus spicatis. Pontederia with heart-shaped leaves and spiked flowers. Sagittæ similis planta palustris Virginiana, spicâ florum cæruleâ. Mor. Hist. 3. p. 618. Virginian marsh plant, like Arrow-head, having a spike of blue flowers.
2. **PONTEDERIA** (*Hastata*) foliis hastatis, floribus umbellatis. Lin. Sp. Plant. 412. Pontederia with spear-pointed leaves, and flowers growing in umbels. Sagittarizæ quodammodo similis planta Maderaspatana, floribus medio caule quasi ex utriculo prodeuntibus. Pluk. Phyt. tab. 220. A plant from Madras, somewhat like Arrow-head, with flowers proceeding from the middle of the stalk.

The first sort grows naturally in marshy places in Virginia, and most parts of North America, and the late Dr. Houstoun found it growing plentifully at La Vera Cruz. This hath a perennial root, from which arise two or three herbaceous thick stalks a foot high, each having one heart-shaped leaf about five inches long, and two and a half broad, of a pretty thick consistence. The base is deeply indented, and the two ears are rounded; the foot-stalk of the leaf closely embraces the stalk like a spatha or sheath, for near three inches in length; above this is another sheath which incloses the spike of flowers; this opens on one side, and the stalk rises near two inches above it, where the spike of flowers begin. The spikes are about three inches long; the flowers are blue, sit very close together, and have the appearance of lip flowers. These appear in June, but are not succeeded by seeds in England.

As this plant grows naturally in moist boggy places, it is very difficult to be preserved in England; nor does the plant arise from seeds here, for I have sowed the seeds in various situations, and managed them different, but could never get up any of the plants; but I had three or four of the plants sent me, inclosed in large clods of earth from New England, which I planted in pots, covering them with Moss, and constantly supplied them with water. With this management two of them flowered, but the following winter destroyed them, as they were not put under shelter; so that to preserve them, they should be placed under a hot-bed frame in winter, where they may be exposed to the open air at all times when the weather is mild.

The second sort grows naturally about Madras in watery places. This rises with a single stalk eight or nine inches high, having one arrow-pointed leaf, whose base embraces the stalk like a sheath, and from the open side of the sheath comes out the flowers, which are at first inclosed in another smaller sheath; these grow in a small kind of umbel; they are composed of six acute-pointed petals which spread open. Each flower stands upon a slender foot-stalk about an inch long; the foot stalk of the leaf rises a considerable height above the flowers, so that they appear to come out from the middle of the stalk.

This sort is much more difficult to preserve in England, because it grows naturally in a hot country, and always in places flowed with water. There was for-

merly one of these plants brought over to Charles Duboise, Esq; at Mitcham, but it was not long-lived here.

POPULAGO. See **CALTHA**.

POPULUS. Tourn. Inst. R. H. 592. tab. 365. Lin. Gen. Plant. 996. The Poplar-tree; in French, *Peuplier*.

The CHARACTERS are,

The male and female flowers grow upon separate trees. The male flowers or katkins have one oblong, loose, cylindrical empalement, which is imbricated. Under each scale, which is oblong, plain, and cut on the border, is situated a single flower without any petal, having a nectarium of one leaf, turbinate at the bottom, and tubulous at the top, and eight stamina terminated by large four-cornered summits. The female flowers are in katkins like the male, but have no stamina; they have an oval acute-pointed germen, with scarce any style, crowned by a four-pointed stigma. The germen afterward becomes an oval capsule with two cells, including many oval seeds having hairy down.

This genus of plants is ranged in the seventh section of Linnæus's twenty-second class, which contains those plants whose male flowers have eight stamina, and grow upon distinct plants from the fruit.

The SPECIES are,

1. **POPULUS** (*Alba*) foliis subrotundis dentato-angulatis subtus tomentosis. Hort. Cliff. 460. Poplar-tree with roundish angular leaves, which are downy on their under side. Populus alba majoribus foliis. C. B. P. 429. White Poplar with larger leaves, commonly called the Abele-tree.
2. **POPULUS** (*Tremula*) foliis subrotundis, dentato-angulatis utrinque glabris. Hort. Cliff. 460. Poplar-tree with roundish leaves, which are angularly indented, and smooth on both sides. Populus tremula. C. B. P. 429.
3. **POPULUS** (*Nigra*) foliis deltoidibus acuminatis ferratis. Hort. Cliff. 460. Poplar with pointed sawed leaves, shaped like the Delta. Populus nigra. C. B. P. 429. Black Poplar.
4. **POPULUS** (*Major*) foliis angulatis ferratis, subtus tomentosis supernè virentibus. Poplar with larger angular sawed leaves, downy on their under side, and dark green on their upper. Populus alba majoribus foliis. C. B. P. 429. Greater white Poplar, or Abele-tree.
5. **POPULUS** (*Balsamifera*) foliis subcordatis oblongis crenatis. Hort. Cliff. 460. Poplar-tree with oblong leaves which are crenated, and almost heart-shaped. Populus nigra folio maximo, gemmis balsamum odoratissimum fundentibus. Catseb. Carolin. 1. p. 34. The Carolina Poplar-tree.
6. **POPULUS** (*Tacamabacca*) foliis subcordatis, infernè incanis, supernè atroviridis. Poplar with leaves which are almost heart-shaped, hoary on their under side, and of a dark green above. Populo similis arbor resinosa altera. C. B. P. 430. Another resinous tree like the Poplar, commonly called Tacamabacca.

The first sort grows naturally in the temperate parts of Europe; this and the fourth sort are frequently confounded together, but they are certainly different species. The fourth sort is commonly called Abele-tree here, and the first white Poplar. The leaves of the fourth sort are large, and divided into three, four, or five lobes, which are indented on their edges; they are of a very dark colour on their upper side, and very white and downy on their under, standing upon foot-stalks which are about an inch long. The young branches of this tree have a purple bark, and are covered with a white down, but the bark of the stem and older branches is gray. In the beginning of April the male flowers or katkins appear, which are cylindrical, scaly, and three inches long, and about a week after come out the female flowers on katkins, which have no stamina like those of the male. Soon after these come out, the male katkins fall off, and in five or six weeks after, the female flowers will have ripe seeds inclosed in a hairy covering, when the katkins will drop, and the seeds will be wafted by the winds to a great distance.

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The leaves of the first sort are rounder, and not much above half the size of those of the fourth; they are indented on their edges into angles, and are downy on their under side, nor are their under surfaces of so dark green. The shoots of this are paler, the katkins are longer, and the down of the seeds is whiter and longer.

The leaves of the third sort are oval, heart-shaped, and slightly crenated on their edges; they are smooth on both sides, and of a light green colour. The katkins of this are shorter than those of the two former. The fifth sort grows naturally in Carolina, where it becomes a very large tree. The shoots of this sort are very strong in England, and are generally cornered; they have a light green bark like some sorts of the Willow. The leaves upon young trees, and also those upon the lower shoots, are very large, almost heart-shaped, and crenated, but those upon the older trees are smaller; and as the trees advance, their bark becomes lighter, approaching to a grayish colour. The katkins of this sort are like those of the black Poplar, and the summits of the stamina are purple.

The shoots of this tree while young, are frequently killed down a considerable length by the frost in winter; but as the trees grow older, their shoots are not so vigorous, and become more ligneous, so are not liable to the same disaster; but the trees should be planted in a sheltered situation, for as their leaves are very large, the wind has great power over them, and the branches being tender, they are frequently broken or split down by the winds in the summer season, where they are much exposed.

The sixth sort grows naturally in Canada, and in other parts of North America; this seems to be a tree of middling growth, and does not spire upward, but sends out many short thick shoots on every side, which are covered with a light brown bark, and garnished with leaves differing from each other in shape and size, most of them almost heart-shaped, but some are oval, and others near to spear-shaped; they are whitish on their under side, but of a dark green on their upper. The katkins are like those of the black Poplar, but the number of stamina in the male flowers is uncertain, from eighteen to twenty-two. The female flowers I have not fully examined, but by the male katkins I have been induced to place it in this genus.

These trees may be propagated either by layers or cuttings, which will readily take root, as also from suckers, which the white Poplars send up from their roots in great plenty; but these are less valuable than those propagated by cuttings, being more liable to send up suckers. The best time for transplanting these suckers is in October, when their leaves begin to decay. These may be placed in a nursery for two or three years to get strength, before they are planted out where they are designed to remain; but if you intend to propagate them from cuttings, it is better to defer the doing of that until February, at which time you may plant truncheons of two or three feet long, thrusting them about a foot and a half into the ground. These will readily take root, and if the soil be moist in which they are planted, they will arrive to a considerable bulk in a few years.

The black Poplar is not so apt to take root from large truncheons, therefore it is the better method to plant cuttings about a foot and a half in length, thrusting them a foot deep into the ground; these will take root very freely, and may be afterward transplanted where they are to remain. This sort will grow upon almost any soil, but will thrive best in moist places.

I have planted cuttings of this tree, which in four years have been bigger in the trunk than a man's thigh, and near twenty feet in height, and this upon a very indifferent soil; but in a very moist soil, it is common for these trees to shoot eight or ten feet in a season; so that where a person hath a mind to make a shelter in a few years, there is scarce any tree so proper for that purpose as this; but they should not be plant-

ed too near the pleasure-garden, because the katkins and down which fall from these trees, will make a prodigious litter in the spring.

The white sorts, as also the Aspen-tree, likewise cause a greater litter in the spring, when their katkins and down fall off; and their roots being very apt to produce a large quantity of suckers, but especially those trees that came from suckers, which renders them unfit to be planted near a house or garden; but when they are interspersed with other trees in large plantations, they afford an agreeable variety, their leaves being very white on their under sides, which, when blown with the wind, are turned to light.

A considerable advantage may be made by planting these trees upon moist boggy soils, where few other trees will thrive. Many such places there are in England, which do not at present bring in much money to their owners; whereas, if they were planted with these trees, they would, in a very few years, over purchase the ground, clear of all expence; but there are many persons, who think nothing except Corn worth cultivating in England; or if they plant timber, it must be Oak, Ash, or Elm; and if their land be not proper for either of these, it is deemed little worth; whereas if the nature of the soil was examined, and proper sorts of plants adapted to it, there might be very great advantage made of several large tracts of land, which at this time lie neglected.

The wood of these trees, especially of the Abele, is very good to lay for floors, where it will last many years; and for its exceeding whiteness, is by many persons preferred to Oak; but being of a soft texture, is very subject to take the impression of nails, &c. which renders it less proper for this purpose: it is also very proper for wainscoting of rooms, being less subject to swell or shrink, than most other sorts of wood; but for turnery ware, there is no wood equal to this for its exceeding whiteness, so that trays, bowls, and many other utensils, are made of it; and the bellows-makers prefer it for their use, as do also the shoemakers, not only for heels, but also for the soles of shoes; it is also very good to make light carts, and the poles are very proper to support Vines, Hops, &c. and the lopping will afford good fuel, which in many countries is much wanted.

The Carolina Poplar may also be propagated by cuttings or layers; the latter is generally practised by the nursery gardeners, being the surest method; and these plants are not so full of moisture as those raised by cuttings, so are less liable to be cut down by the frost when young. There has been no trials made here of the wood of this tree, so I cannot give any account of its worth.

The Tacamahacca sends up a great number of suckers from the roots, by which it multiplies in plenty, and every cutting which is planted will take root; so that when a plant is once obtained, there may soon be plenty of the plants raised. The buds of this tree are covered with a glutinous resin, which smells very strong, and this is the Tacamahacca used in the shops.

PORRUM. Tourn. Inst. R. H. 382. tab. 204. Allium. Lin. Gen. Plant. 370. [in Greek is called *πράσιον*, from *πράω*, to enkindle, as being a plant that excites a warmth in the body.] Leek.

The CHARACTERS are,

The flower hath six bell-shaped petals, which are collected into a spherical head, covered by a common roundish spathe or sheath, which opens on one side, and withers. These have six stamina, three of which are alternately broader than the other, and have forked summits in their middle. They have a short, round, three-cornered germen, supporting a single style, crowned by an acute stigma. The germen afterward becomes a short broad capsule with three lobes, having three cells filled with angular seeds.

This genus of plants is joined to Linnæus's genus of Allium, which is ranged in the first section of his sixth class, including the plants whose flowers have six stamina and one style. The joining of these genera together is allowable in a system of botany, but

in a treatise upon gardening, it would not so well please; for as the Leek has always been distinguished from Garlick and Onion by gardeners, so it would rather confuse than instruct the practitioners, if they were joined; and as the species of Garlick are numerous, so where their species are lessened, by dividing them into genera, it will be no less useful to botanists.

The SPECIES are,

1. PORRUM (*Sativum*) radice oblongâ tunicatâ, caule planifolio, floribus capitatis, staminibus tricuspidatis. *Leek with an oblong coated root, a plain leaf on the stalk, flowers collected in heads, and three-pointed stamina.* Porrum commune capitatum. C. B. P. 72. *Common-beaded Leek, commonly called London Leek.*

2. PORRUM (*Ampeloprasum*) caule planifolio umbellifero, umbellâ globosâ, staminibus corollâ longioribus. *Leek with a plain leaf on the stalk, which supports a globular umbel of flowers, whose stamina are longer than the petals.* Porrum Siberienfe, floribus purpurascens. Gmel. *Siberian Leek having purplish flowers.*

The first sort is commonly cultivated in the English gardens; of this there has been generally supposed two sorts, but I have made trial of them both, by sowing their seeds several times, and find they are the same; the difference which has risen between them, has been occasioned by some persons having saved the seeds from old roots, and not from the seedling Leeks, whereby they have degenerated them, and rendered them smaller and narrower leaved; but by care this may be recovered again, as I have experienced.

The other sort grows naturally in Siberia; this hath narrower leaves than the common sort, the stalks are smaller, and do not rise so high; the heads of flowers are also smaller, and of a purplish colour; the stamina stand out beyond the flower.

Leeks are cultivated by sowing their seeds in the spring, in the same manner as was directed for Onions, with which these are commonly sown, the two sorts of seeds being mixed according to the proportion which is desired of either sort; though the most common method is, to mix an equal quantity of both, for the Onions will greatly out-grow the Leeks in the spring; but these being drawn off early in August, the Leeks will have time to grow large afterwards, so that there may be a moderate crop of both sorts. The management of Leeks being exactly the same with Onions, I shall not repeat it in this place; but shall only add, that many persons sow their Leeks very thick in beds in the spring; and in June, after some of their early crops are taken off, they dig up the ground, and plant their Leeks out thereon, in rows a foot apart, and six inches asunder in the rows, observing to water them until they have taken root; after which they will require no further culture, but to clear the ground from weeds. The Leeks thus planted will grow to a moderate size, provided the ground be good, and this method is very proper for such persons who have little room.

If you would save the seeds of this plant, you should make choice of some of the largest and best Leeks you have, which must remain in the place where they grew until February, when they should be transplanted in a row against a warm hedge, pale, or wall, at about eight inches asunder; and when their stems advance, they should be supported by a string, to prevent their being broken down, to which they are very liable, especially when in head; and the closer they are drawn to the fence in autumn, the better the seeds will ripen; for it sometimes happens in cold summers or autumns, that those which grow in the open garden, do not perfect their seeds in this country; especially if there should be sharp frosts early in autumn, which will entirely spoil the seed.

When it is ripe (which may be known by the heads changing brown) you should cut off their heads with about a foot or more of the stalk to each, and tie them in bundles, three or four heads in each, and hang them up in a dry place, where they may remain till

Christmas or after, when you may thresh out the seeds for use. The husk of these seeds is very tough, which renders it very difficult to get out the seeds; therefore some persons who have but a small quantity, rub it hard against a rough tile, which will break the husks, and get the seeds out better than most other methods I have known used.

PORTULACA. Tourn. Inst. R. H. 236. tab. 118. Lin. Gen. Plant. 531. Purslane; in French, *Pourpier*.

The CHARACTERS are,

The empalement of the flower is small, bifid, and permanent, sitting upon the germen. The flower has five plain, erect, obtuse petals, and many hair-like stamina, about half the length of the petals, terminated by single summits; and a roundish germen, supporting a short style, crowned by five oblong stigmas. The germen afterward becomes an oval capsule with one cell, containing many small seeds.

This genus of plants is ranged in the first section of Linnæus's eleventh class, which contains the plants whose flowers have from eleven to nineteen stamina inclusive, and one style.

The SPECIES are,

1. PORTULACA (*Oleracea*) foliis cuneiformibus, floribus sessilibus. Prod. Leyd. 473. *Purslane with wedge-shaped leaves, and flowers growing close to the stalks.* Portulaca latifolia seu fativa. C. B. P. 288. *Broad-leaved, or Garden Purslane.*

2. PORTULACA (*Pilosa*) foliis subulatis alternis, axillis pilosis, floribus sessilibus terminalibus. Lin. Sp. Plant. 445. *Purslane with axel-shaped leaves placed alternately, hairy joints, and flowers sitting close to the stalks.* Portulaca Curassavica angusto longo lucidoque folio, procumbens. Hort. Amst. 1. p. 2. *Trailing Purslane of Curassô, with long, narrow, shining leaves.*

3. PORTULACA (*Anacampseros*) foliis ovatis gibbis, pedunculo multifloro, caule fruticoso. Lin. Sp. Plant. 445. *Purslane with oval gibbous leaves, foot-stalks having many flowers, and a shrubby stalk.* Telephiastrum folio globofo. Hort. Elth. 376. *Bastard Orpine with a globular leaf.*

The first sort grows naturally in America, and most of the hot parts of the globe. This is the common Purslane which is cultivated in the gardens, and is so generally known as to need no description. There are two varieties of this, one with deep green leaves, and the other hath yellow leaves, which is called Golden Purslane; but as both these arise from the same seeds, so they are only feminal variations. There is also a third variety with smaller and less succulent leaves, which is called wild Purslane, because wherever it is once sown in a garden, and the plants permitted to scatter seeds, the plants will come up as weeds the following year; but this I am sure is a degeneracy from the Garden Purslane, for I have sown it several times and let the plants shed their seeds, and it has come up from those seeds in two years, degenerated to the wild sort.

Purslane is propagated from seeds, which may be sown upon beds of light rich earth during any of the summer months; but if you intend to have it early in the season, it should be sown upon a hot-bed; for it is too tender to be sown in the open air before April, and then it must be in a warm situation. This seed is very small, so that little of it will be sufficient to supply a family. There is no other culture which this plant requires, but to keep it clear from weeds, and in dry weather to water it two or three times a week. In warm weather this plant will be fit for use in six weeks after sowing, so that in order to continue a succession of it, you should sow it at three or four different seasons, allowing a fortnight or three weeks between each sowing, which will be sufficient to last the summer, so long as it is proper to be eaten; for being of a very cold nature, it is unsafe to be eaten, except in the heat of summer in England; for which reason, it is not to any purpose to sow it upon a hot-bed, since it will come early enough for use in the open air.

If the seeds are intended to be sowed, a sufficient number of the earliest plants should be left for this purpose, drawing out all those which are weak, or have small leaves, from among them; and when the seeds are ripe, the plants should be cut up, and spread upon cloths in the sun to dry, and then the seeds may be easily beaten out and sifted, to clear it from the leaves and seed-vessels.

The second sort grows naturally in most of the islands of the West Indies; this is annual; the stalks are very succulent, of a purple colour, and branch out greatly; the lower branches lie near the ground, but those above them are more erect; the leaves are narrow, awl-shaped, and of a lucid green; they are placed alternately on the branches. At the joints there come out tufts of white hairs, and between these come out the flowers sitting close to the branches; they are of a fine Pink colour, but of short duration, seldom continuing open longer than five or six hours; these are succeeded by short roundish capsules, filled with small black seeds. It flowers from the middle of June till autumn.

The third sort grows naturally at the Cape of Good Hope; this is a perennial plant with a shrubby stalk, which rises four or five inches high, garnished with thick, globular, succulent leaves; at the top of the stalk comes forth a slender foot-stalk about two inches long, sustaining four or five Rose-shaped flowers of a red colour. These appear in July, but are not succeeded by seeds in England. This plant is too tender to live in the open air in winter, so it must be kept in pots, and treated in the same way as the most succulent kinds of Aloes. It is propagated by cuttings.

POTENTILLA. Lin. Gen. Plant. 559. Quinquifolium pentaphylloides. Tourn. Inst. R. H. 296. tab. 153, 298. Cinquefoil; in French, *Quinte-feuille*.

The CHARACTERS are,

The empalement of the flower is of one leaf, which is slightly cut into ten parts; the segments are alternately less and reflexed. The flower is composed of five petals, which are inserted into the empalement, and spread open. It hath twenty awl-shaped stamina inserted in the empalement, terminated by moon-shaped summits. In the center of the flower there are several germen collected into one head, with very slender styles inserted in the side of the germen, crowned by obtuse stigmas. After the flower is past, the germen becomes a head of roundish seeds, included in the empalement.

This genus of plants is ranged in the fifth section of Linnæus's twelfth class, which includes those plants whose flowers have about twenty stamina inserted in the empalement, and have many germen.

The SPECIES are,

1. POTENTILLA (*Anserina*) foliis pinnatis serratis, caule repente. Flor. Lapp. 210. *Potentilla with winged sawed leaves, and a creeping stalk.* Pentaphylloides argenteum alatum, seu potentilla. Tourn. Inst. 298. *Silver Weed, or Wild Tansy.*
2. POTENTILLA (*Rupestris*) foliis pinnatis alternis, foliolis quinis ovatis crenatis, caule erecto. Hort. Cliff. 193. *Potentilla with alternate winged leaves, having five oval crenated lobes, and an erect stalk.* Pentaphylloides erectum. J. B. 2. p. 398. *Upright Cinquefoil.*
3. POTENTILLA (*Fruticosa*) foliis pinnatis, caule fruticoso. Hort. Cliff. 193. *Potentilla with winged leaves and a shrubby stalk.* Pentaphylloides rectum fruticosum Eboracense. Mor. Hist. 2. 193. *Upright shrubby Cinquefoil of Yorkshire, commonly called shrubby Cinquefoil.*
4. POTENTILLA (*Recta*) foliis septenatis lanceolatis serratis utrinque subpilosis, caule erecto. Lin. Sp. Plant. 711. *Potentilla with seven spear-shaped, sawed, hairy leaves, and an erect stalk.* Quinquifolium erectum luteum. C. B. P. 325. *Yellow upright Cinquefoil.*
5. POTENTILLA (*Argentea*) foliis quinatis cuneiformibus incis subtus tomentosis, caule erecto. Lin. Sp. Plant. 497. *Potentilla with five wedge-shaped cut leaves, which are woolly on their under side, and have an erect stalk.*

Quinquifolium folio argenteo. C. B. P. 325. *Cinquefoil with a silvery leaf.*

6. POTENTILLA (*Caulescens*) foliis quinatis apice conniventis serratis, caulibus multifloris erectis, receptaculis hirsutis. Hort. Cliff. 194. *Potentilla with five leaves whose points are sawed, erect stalks with many flowers, and hairy receptacles.* Quinquifolium album minus alterum. C. B. P. 325. *Another smaller white Cinquefoil.*
7. POTENTILLA (*Monspeliensis*) foliis ternatis, caule ramoso erecto, pedunculis supra genicula enatis. Hort. Upsal. 134. *Potentilla with leaves growing by threes, an upright branching stalk, and foot-stalks rising above the joints.* Fragaria sterilis Alpina caulescens. Boerh. Ind. alt. 1. p. 42. *Stalky Alpine barren Strawberry.*
8. POTENTILLA (*Grandiflora*) foliis ternatis, dentatis utrinque subpilosis, caule decumbente foliis longiore. Lin. Sp. Plant. 715. *Potentilla with three hairy leaves, and a trailing stalk longer than the leaves.* Fragaria sterilis amplissimo folio & flore, petalis cordatis. Vaill. Paris. 55. tab. 10.
9. POTENTILLA (*Heptaphylla*) foliis septenis quinatisque, foliolis pinnato-incisis pilosis, caule erecto ramoso. *Potentilla with seven and five leaves, whose lobes are cut, winged, and hairy, and an upright branching stalk.* Quinquifolium quod pentaphyllum seu potius heptaphyllum rectum, caule rubro hirsutis. Hort. Cath. *Cinquefoil or Septfoil, with a red, upright, hairy stalk.*

There are many more species of this genus, which are preserved in botanic gardens for the sake of variety, but as they are not cultivated in other places either for use or beauty, I shall not enumerate them here.

The first sort here mentioned, grows naturally upon cold stiff land in most parts of England, and is a sure mark of the sterility of the soil. It spreads its stalks upon the ground, which send out roots from their joints, fastening into the ground, and thereby propagates so fast, as in a little time to spread over and fill the ground to a great distance. The leaves are composed of several lobes (or wings) which are generally placed alternately along the midrib, and terminated by an odd one; they are sawed on their edges, and are of a silvery colour, especially on their under side. The flowers are produced singly upon very long foot-stalks, which arise from the root; they are composed of five yellow petals, which expand in form of a Rose; these have a great number of stamina which are inserted to the petals, and many germen collected in heads, which afterward become many acute-pointed seeds wrapped up in the empalement. It flowers great part of summer. The leaves of this plant are used in medicine, and are accounted restraining and vulnerary. It is rarely cultivated in gardens, being a very common weed in England.

The second sort grows naturally on the Alps, and mountains in Germany. This hath a perennial root, which sends out several heads joined together; from these arise the foot-stalks of the leaves, which are long, and sustain three pair of roundish lobes, terminated by an odd one; these are crenated on their edges, and sit close to the midrib. Out of each head arises a hairy stalk about nine inches high, having at each joint one or two trifoliate leaves, shaped like those below, but smaller; the upper part of the stalk divides into small foot-stalks, each sustaining two or three white flowers, very like those of the Strawberry. These appear in June, and are succeeded by seeds like those of the former. It is easily propagated by seeds, or parting of the roots; the best time of sowing the seeds is in the autumn, and that is also the season for parting and transplanting the roots; it loves a moist soil and a shady situation.

The third sort grows naturally in the northern counties of England, and in many of the northern parts of Europe. This hath a shrubby stalk, which rises about four feet high, dividing into many branches; which are garnished by winged leaves, composed of two

two or three pair of narrow, acute-pointed, entire lobes, which are hairy, and pale on their under side. The flowers are produced at the end of the branches in clusters; they have five yellow petals spreading open in form of a Rose, with many germen and stamina within. These appear in July, and are sometimes succeeded by seeds inclosed in the empalement. This plant is commonly cultivated in the nursery-gardens as a flowering shrub, by suckers, or laying down the tender branches, which will take root in one year, and may then be taken off from the old plants, and planted in a nursery for a year or two to get strength, before they are planted where they are designed to remain. It may also be propagated by cuttings, which may be planted in autumn in a moist shady border, where they will take root the next spring, and the Michaelmas following may be transplanted into the nursery.

The best season for transplanting of these plants is in October, that they may get new roots before the hard frost sets in; for as this plant grows naturally upon moist boggy land, so when it is removed in the spring, if due care is not taken to water it in dry weather, it is apt to miscarry; nor will this plant live in a hot dry soil, but in a shady situation and on a cool moist soil it will thrive exceedingly.

The fourth sort grows naturally in the south of France and Italy; this hath hand-shaped leaves, composed of five or seven lobes which join at their base, where they meet the foot-stalk; they are deeply crenated on their sides, and are hairy on both sides. The stalks rise nine or ten inches high, branching toward the top, and garnished at each joint with one leaf, of the same form as those below, but smaller. The flowers grow at the top of the stalk; they are white, and shaped like those of the former sort, appearing about the same time, and are succeeded by seeds like those. This is a biennial plant, which dies soon after the seeds are ripe. It may be propagated as the second sort.

The fifth sort grows naturally on the Alps, and in other rough hilly parts of Europe. This hath a thick fleshy root which strikes deep in the ground, from which arise several purple branching stalks about a foot high, garnished with leaves composed of five wedge-shaped lobes, which are deeply cut on their edges, and are very hoary on their under side. The flowers grow at the top of the stalk, which branches out into many foot-stalks; they are yellow, and shaped like those of the fourth sort, but smaller. The root is perennial, and the plant may be propagated as the second sort.

The sixth sort grows on the mountains in Austria; this hath a perennial root; the leaves stand upon foot-stalks which arise from the root, and are very long; they are composed of five oblong lobes which are a little sawed at their ends, very hoary and silky on their under sides, but green on their upper. The flowers are produced upon long slender foot-stalks, which arise immediately from the root; they are white, and shaped like those of the other species, appearing in May, but are seldom succeeded by seeds in England. It may be easily propagated by runners in the same manner as the Strawberry; the best time to transplant them is in autumn. It loves a cool soil and a shady situation.

The seventh sort grows naturally near Montpellier; this is a perennial plant; the stalks grow erect, about a foot high; they are very hairy, and garnished with trifoliate oblong leaves, sawed on their edges. The flowers are produced upon foot-stalks, which come out above the joints of the stalk; they are white, and large. This plant flowers in June, and the seeds ripen in autumn, which, if permitted to scatter, will produce plants in plenty the following spring, which will require no other culture but to keep them clean from weeds.

The eighth sort is also a perennial plant, but differs from the other in having trailing stalks; the lobes of the leaves are oval, obtuse, and bluntly indented

on their edges; the flowers are larger, and the whole plant is of a deeper green. It flowers in July, and the seeds ripen in autumn. It propagates itself like the former sort.

The ninth sort grows naturally in Italy and Sicily; this is a perennial plant; the stalks rise near two feet high, they are purple and very hairy, garnished with leaves composed of five or seven narrow lobes, which are deeply cut on their sides, so as to resemble those of winged leaves; the stalks branch out greatly toward their top. The flowers are yellow, and shaped like those of the fourth sort. It flowers in June, and the seeds ripen in autumn. It may be propagated as the fourth sort.

POTERIUM. Lin. Gen. Plant. 948. Pimpinella. Tourn. Inst. R. H. 156. tab. 68. Burnet; in French, *Pimprenelle*.

The CHARACTERS are,

It hath male and female flowers in the same spike. The male flowers have a three-leaved empalement; they have one petal, which is cut into four parts; these are oval, concave, and permanent, and a great number of long hair-like stamina, terminated by roundish twin summits. The female flowers have one wheel-shaped petal with a short tube, cut at the brim into four parts; these have no stamina, but two oblong oval germen, with two hairy styles the length of the petal, crowned by coloured pencil-shaped stigmas. The germen afterward becomes two hard seeds, inclosed in the petal of the flower.

This genus of plants is ranged in the eighth section of Linnæus's twenty-first class, which includes those plants whose flowers are male and female in the same spike, and the male flowers have many stamina.

The SPECIES are,

1. POTERIUM (*Sanguisorba*) inermis, caulibus subangulosis. Hort. Cliff. 446. *Unarmed Poterium with angular stalks.* Pimpinella sanguisorba minor hirsuta. C. B. P. 160. *Smaller hairy Burnet.*
2. POTERIUM (*Hybridum*) inermis, caulibus teretibus strictis. Lin. Sp. Plant. 994. *Unarmed Poterium with a narrow taper stalk.* Pimpinella agrimonoides odorata. H. R. Par. *Sweet-smelling Burnet resembling Agrimony.*
3. POTERIUM (*Spinosum*) spinis ramosis. Hort. Cliff. 445. *Poterium with branching spines.* Pimpinella spinosa, seu sempervirens. Mor. Umb. 57. *Prickly or evergreen Burnet.*

The first sort is the common Burnet, which grows naturally upon chalky lands in many parts of England; of this there are two or three varieties, one of them is much smoother than the other, and the third hath larger seeds than either of the former; but these differences are not constant, being only seminal variations. This is a perennial plant, from whose root arise a great number of leaves, standing on pretty long foot-stalks; they are composed of five or six pair of lobes, terminated by an odd one. The lobes are generally ranged a little alternate on the midrib, but sometimes stand by pairs; they are sawed on their edges, and are sometimes smooth, and at others hairy. The stalks rise a foot and a half high, branching out pretty much, and are terminated by long slender foot-stalks, each sustaining an oblong spike of flowers; in which there are some male and others female; they are of a purplish red colour, and appear in June. The female flowers are each succeeded by two hard seeds, which ripen in autumn.

This plant is propagated in gardens; the young tender leaves are put into sallads in winter and spring, and the leaves are used for cool tankards in hot weather. It is used in medicine, and is reckoned to be cordial and alexipharmic. The powder of the root is commended against spitting of blood.

This plant is easily propagated by seeds, which should be sown in autumn soon after they are ripe; for if it is sown in spring, the seeds frequently lie in the ground till the spring following. If the seeds are permitted to scatter, the plants will come up in plenty; and if these are transplanted out in a bed of undunged earth, at about a foot distance every way, and kept clean

clean from weeds, they will continue some years, especially if the soil is dry, and will require no other care. It may also be propagated by parting the roots in autumn; but as the plants arise so freely from scattered seeds, the latter method is seldom practised. This plant has been of late recommended by persons of little skill, to be sown as a winter pabulum for cattle; but whoever will give themselves the trouble to examine the grounds where it naturally grows, will find the plants left uneaten by the cattle, when the Grass about them has been cropped to the roots; beside, in wet winters and on strong land, the plants are of short duration, therefore very unfit for the purpose, nor is the produce sufficient to tempt any persons of skill to engage in its culture; therefore I wish those persons to make trials of it in small quantities, before they embark largely in these new schemes.

The second sort grows naturally in the south of France and Italy; this is a biennial plant, which decays soon after the seeds are ripe. The leaves of this are like those of Agrimony, and are composed of three or four pair of oblong lobes, placed a little alternate on the midrib, and terminated by an odd one: they are deeply sawed on their edges, and have an agreeable scent; the stalks rise two feet high, and are garnished at each joint with one of those winged leaves, which gradually diminish in their size at the top, and just above the leaf arises a long foot-stalk, which supports two or three small ones, each sustaining a small roundish spike of flowers. These appear in July, and are succeeded by seeds which ripen in autumn. It is propagated by seeds, which, if sown in autumn, the plants will come up the following spring. These require no other culture than to thin them where they are too close, and keep them clean from weeds; the second year they will flower and ripen their seeds, and soon after decay.

The third sort grows naturally in Crete, and in many of the islands of the Archipelago. This hath a shrubby perennial stalk, which rises about three feet high, dividing into several slender branches, which are armed with branching sharp thorns; the leaves are very small; they are winged, and have six or seven pair of very small lobes, ranged opposite along the midrib, terminated by an odd one; they are of a lucid green, and continue all the year. The flowers are produced in small heads at the end of the branches, and are of an herbaceous colour; they appear the beginning of June, and there is a succession of them most part of summer; but those only which come early, are sometimes succeeded by seeds in England.

This plant is too tender to live through the winter in the open air; but if it is sheltered under a common hot-bed frame in winter, where it may have the free air at all times when the weather is mild, and sheltered from hard frost, it will thrive better than when it is more tenderly treated. It may be propagated by slips or cuttings during any of the summer months, which, if planted in a bed of light earth, and covered down close with a hand or bell-glass, and shaded from the sun, will take root and may then be taken up, and planted each into a separate small pot, filled with fresh undunged earth, and placed in the shade till they have taken new root, and then removed to a sheltered situation, where they may stand till the frost comes on, when they should be placed under the hot-bed frame. It requires but little water, especially in cool weather, and wants no particular culture.

PRASIUM. Lin. Gen. Plant. 655. Galeopsis. Tourn. Inst. R. H. 186. Shrubby Hedge-nettle.

The CHARACTERS are,

The flower hath a bell-shaped empalement of one leaf, divided into two lips; the upper lip is broad, and ends in three acute points; the lower lip is cut into two parts. The flower is of the lip kind; it hath one petal; the upper lip is oval, erect, and indented at the end. The lower lip is broad, reflexed, and ends in three points, the middle one being broadest. It has four awl shaped stamina under the upper lip, two of which are shorter than the other, having oblong summits on their side, and a four-

pointed germen sustaining a slender style the length of the stamina, crowned by a bifid stigma. The germen afterward become four berries, each containing a single roundish seed.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two shorter stamina, and the seeds are naked.

The SPECIES are,

1. PRASIUM (*Majus*) foliis ovato-oblongis serratis. Lin. Hort. Cliff. 309. *Shrubby stinking Hedge-nettle, with oblong, oval, sawed leaves. Galeopsis Hispanica frutescens, teucris folio.* Tourn. Inst. 186. *Spanish, shrubby, stinking Hedge-nettle, with a Tree Germander leaf.*
2. PRASIUM (*Minus*) foliis ovatis duplici utrinque crenatis. Lin. Hort. Cliff. 309. *Shrubby stinking Hedge-nettle, with oval leaves which are indented on every side. Lamium fruticans, teucris folio lucido, calyce & flore magno candido: tantillâ purpurâ variè notato.* Hort. Cath. 106. *Shrubby Dead-nettle, with a lucid Tree Germander leaf, and a large white flower with some spots of purple.*

The first sort grows naturally in Spain and Italy; this rises with a shrubby stalk two feet high, covered with a whitish bark, and divides into many branches, which are garnished with oblong oval leaves, sawed on their edges. The flowers come out from the bosom of the leaves in whorls round the stalks; they are white, and have large permanent empalements, cut into five points. The flowers are of the lip kind; they appear in June and July, and are succeeded by four small berries sitting in the empalement, which turn black when they are ripe, and have a single roundish seed in each.

The second sort grows naturally in Sicily; this hath a shrubby stalk like the former, but rises a little higher; the bark is whiter, the leaves are shorter and oval, and are doubly crenated on each side; they are of a lucid green. The flowers come out in small whorls from the bosom of the leaves, like the former; they are somewhat larger, and are frequently marked with a few purple spots; these are succeeded by small berries like the other sort, which ripen at the same time. These plants may be propagated either by cuttings, or from the seeds: if they are propagated by cuttings, they should be planted on a shady border toward the end of April; but the cuttings should not be taken from such plants as have been drawn weak, but rather from those which have been exposed to the open air, whose shoots are short and strong; and if a joint of the former year's wood is cut to each of them, they will more certainly succeed. These cuttings may remain in the same border till they are well rooted, when they may be transplanted into the places where they are to remain, or into pots, that they may be sheltered in winter under a common frame, where they may have as much free air as possible in dry weather, but only require to be screened from hard frost. If they are propagated by seeds (which the plants produce in plenty every year) they should be sown on a bed of light earth in April; and in May the plants will come up, when they require no other care but that of keeping them clean from weeds; and in the autumn following, they may be transplanted in the same manner as before directed for those raised from cuttings, and may be afterward treated more hardily, as they acquire strength.

A plant or two of each of these species may be allowed to have a place where there are collections of the different sorts of ever-green shrubs, for the sake of variety; especially where the different sorts of Cistus, Phlomis, Tree-wormwood, and Medicago, are admitted, because these are equally hardy; and when a severe winter happens, which destroys the one, the others are sure of the same fate; but in mild winters they will live abroad, especially if they are planted in a dry rubbishy soil, and have a sheltered situation; but in rich wet ground, the plants will grow vigorous in summer, so are liable to injury from the early frosts in autumn.

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PRENANTHES. Lin. Gen. Plant. 816. Vaill. Mem. ann. 1721. Wild Lettuce.

The CHARACTERS are,

It hath a smooth cylindrical empalement spreading at the brim, having many scales, which are equal, but have three at the base unequal. This common empalement includes from five to eight hermaphrodite florets, disposed in a single round order; they have one petal, which is stretched out like a tongue, and indented in four parts at the end; they have five short hair-like stamina, terminated by cylindrical summits. The germen is situated under the petal, supporting a slender style longer than the stamina, crowned by a bifid reflexed stigma. The germen afterward becomes a single heart-shaped seed, crowned with hairy down.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which includes the plants with a flower composed of all hermaphrodite or fruitful florets, whose stamina and style are connected.

The SPECIES are,

1. **PRENANTHES** (*Muralis*) flosculis quinis, foliis runcinatis. Hort. Cliff. 383. *Prenanthes with five florets and spear-shaped leaves. Lactuca sylvestris murorum, flore luteo. J. B. 2. p. 1004. Wild Wall Lettuce with a yellow flower.*
2. **PRENANTHES** (*Purpurea*) flosculis quinis, foliis lanceolatis denticulatis. Hort. Cliff. 383. *Prenanthes with five florets, and spear-shaped indented leaves. Lactuca montana purpuro-cæruleo major. C. B. P. 123. Greater purple, blue, Mountain Lettuce.*
3. **PRENANTHES** (*Altissima*) flosculis quinis foliis trilobis, caule erecto. Lin. Sp. Plant. 797. *Upright Prenanthes with five florets, and leaves having three lobes. Prenanthes Canadensis altissima, foliis variis, flore luteo. Vaill. Act. 1721. Tallest Prenanthes of Canada, with variable leaves and a yellowish flower.*
4. **PRENANTHES** (*Amplexicaule*) flosculis quinis, caule ramoso foliis ovato-lanceolatis semiamplexicaulibus. *Prenanthes with five florets, a branching stalk, and oval spear-shaped leaves half embracing the stalk. Lactuca montana, purpuro-cærulea minor. C. B. P. 143. Smaller purple, blue, Mountain Lettuce.*

The first sort grows naturally upon walls and dry shady banks in many parts of England, so is never cultivated in gardens. The second sort grows naturally upon the Helvetian Mountains; this hath a creeping root, which spreads far in the ground, so becomes a troublesome weed if admitted into gardens. The stalks of this rise four feet high; the leaves are spear-shaped, and a little indented toward their ends; the flowers are of a purple blue colour, and are produced loose in panicles from the sides, and at the top of the stalks. These appear in July, and are succeeded by seeds which ripen in autumn.

The third sort grows naturally in most parts of North America, where it is called Dr. Witt's Rattle-snake root; this seldom lives longer than two years. The lower leaves are four or five inches long, and three broad; they are sometimes divided into five lobes, but generally into three; they are indented a little on their edges, smooth, of a dark green on their upper side, but pale on their under. The stalks rise three feet high, and are garnished with a few small leaves which are entire; the flowers come out from the side of the stalk in small bunches; these are of a pale yellow colour, and appear in July. They are succeeded by seeds, crowned with hairy down, which ripen in autumn. There is a variety of this with pale purple flowers which arise from the same seeds. The roots of these plants are said to be an antidote to expel the venom of the rattle-snake, which induced me to mention these plants.

The fourth sort grows naturally on the mountains in Germany; this hath a perennial root. The stalks rise a foot high, and branch out on each side; the leaves are spear-shaped and oval; their base is broad, and half surrounds the stalk; the flowers grow loosely upon slender foot-stalks, which come out from the side, and at the end of the branches. These appear in June, and the seeds ripen in autumn.

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These plants are seldom admitted into gardens, but if any person is desirous to cultivate them, if they sow the seeds soon after they are ripe, in a sheltered situation, the plants will come up, and require no other care but to keep them clean from weeds.

PRIMULA. Lin. Gen. Plant. 180. *Primula veris.* Tourn. Inst. R. H. 124. tab. 47. [This plant is so called, because it is the first plant that appears in the spring.] The Primrose; in French, *Primevere*.

The CHARACTERS are,

The flower hath a five-cornered tubulous empalement of one leaf, ending in five acute points; it hath one petal, with a cylindrical tube the length of the empalement, but spreads open above, where it is cut into five heart-shaped segments. It has five short stamina situated in the neck of the petal, terminated by erect acute-pointed summits, and a globular germen supporting a slender style, crowned by a globular stigma. The germen afterward turns to an oblong capsule with one cell, opening at the top, filled with small angular seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. **PRIMULA** (*Veris*) foliis dentatis rugosis, pedunculis unifloris. *Primrose with rough indented leaves, and foot-stalks bearing one flower. Primula veris odorata, flore luteo simplici. J. B. 3. p. 495. Sweet-smelling Primrose with a single yellow flower, or common Primrose.*
2. **PRIMULA** (*Elatior*) foliis dentatis rugosis, floribus fastigiatis. *Primrose with rough indented leaves, and flowers growing in bunches. Primula veris pallido flore elatior. Clus. Hist. 301. Taller Primrose with a pale flower, called Cowslip.*
3. **PRIMULA** (*Farinosa*) foliis crenatis glabris, florum limbo plano. Hort. Cliff. 50. *Primrose with smooth crenated leaves, and a plain border to the flower. Primula veris rubro flore. Clus. Hist. 300. Primrose with a red flower, called Bird's-eyen.*
4. **PRIMULA** (*Polyantha*) foliis petiolatis subcordatis crenatis, floribus fastigiatis pedunculis longissimis. *Primrose or Cowslip with heart-shaped crenated leaves having foot-stalks, and flowers growing in bunches on very long foot-stalks.*

The first sort of Primrose grows wild in woods, and other shady places in most parts of England, from whence their roots may be easily transplanted into the garden, where, if they are placed under hedges, and in shady walks, they make a beautiful appearance early in the spring, when few other plants are in flower.

This plant is so well known as to need no description; the flowers and roots of this are used in medicine.

There are several varieties of this which have been accidentally obtained, as the paper-white Primrose with single and double flowers, the common Primrose with double flowers, the red Primrose with single and double flowers; these have but one flower upon a foot-stalk.

The second sort is the Cowslip, or Paigle, or Paralysis of the shops; this grows naturally in meadows and moist pastures in many parts of England. The flowers of this sort grow in bunches at the top of the stalk, so are easily distinguished from the former; they are much used in medicine, and sometimes the leaves. As these grow wild, their roots may be taken up and transplanted into gardens.

The best time to transplant them is at Michaelmas, that their roots may have strength to produce their flowers early in the spring. These delight in a strong soil, but will grow in almost any sort of earth, provided they have a shady situation.

There are a great variety of this at present in the gardens, as the Hose in Hose, the double Cowslip, and all the sorts of Polyanthus, which have been so much improved within the last fifty years, as to almost equal the variety of the Auriculas; and in some parts of England they are so much esteemed as to sell for a guinea a root, so that there may be still a much greater

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greater variety raised, as there are so many persons engaged in the culture of this flower.

The several varieties of Polyanthus are produced by sowing of seeds, which should be saved from such flowers as have large upright stems, producing many flowers upon a stalk, which are large, beautifully striped, open flat, and not pin-eyed. From the seeds of such flowers there is room to hope for a great variety of good sorts, but there should be no ordinary flowers stand near them, lest, by the mixture of their farina, the seeds should be degenerated.

These seeds should be sown in boxes filled with light rich earth in December, being very careful not to bury the seed too deep; for if it be only slightly covered with light earth, it will be sufficient. These boxes should be placed where they may have the benefit of the morning sun until ten of the clock, but must by no means be exposed to the heat of the day, especially when the plants begin to appear; for at that time, one whole day's sun will entirely destroy them. In the spring, if the season should prove dry, you must often refresh them with water, which should be given very moderately; and, as the heat increases, you should remove the boxes more in the shade, for the heat is very injurious to them.

By the middle of May these plants will be strong enough to plant out, at which time you should prepare some shady borders which should be made rich with neats dung, upon which you must set the plants about four inches asunder every way, observing to water them until they have taken root; after which they will require no farther care but to keep them clear from weeds, until the latter end of August following, when you should prepare some borders which are exposed to the east, with good light rich earth, into which you must transplant your Polyanthus, placing them six inches asunder equally in rows, observing, if the season proves dry, to water them until they have taken root; in these borders your plants will flower the succeeding spring, at which time you must observe to mark such of them as are fine to preserve, and the rest may be transplanted into wildernesses, and other shady places in the garden, where, although they are not very valuable flowers, they will afford an agreeable variety.

Those which you intend to preserve, may be removed soon after they have done flowering (provided you do not intend to save seeds from them), and may be then transplanted into a fresh border of the like rich earth, allowing them the same distance as before, observing also to water them until they have taken root; after which they will require no farther care, but only to keep them clean from weeds, and the following spring they will produce strong flowers, as their roots will be then in full vigour; so that if the kinds are good, they will be little inferior to a shew of Auriculas. These roots should be constantly removed and parted every year, and the earth of the border changed, otherwise they will degenerate, and lose the greatest part of their beauty.

If you intend to save seeds, which is the method to obtain a great variety, you must mark such of them, which, as I said before, have good properties. These should be, if possible, separated from all ordinary flowers, for if they stand surrounded with plain-coloured flowers, they will impregnate each other, whereby the seeds of the valuable flowers will not be near so good, as if the plants had been in a separate border, where no ordinary flowers grew; therefore the best way is to take out the roots of such as you do not esteem as soon as the flowers open, and plant them in another place, that there may be none left in the border, but such as you would chuse for seeds. The flowers of these should not be gathered, except such as are produced singly upon pedicles, leaving all such as grow in large bunches; and if the season should prove dry, you must now and then refresh them with water, which will cause their seed to be larger, and in greater quantity, than if they were

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entirely neglected. In June the seed will be ripe, which may be easily known by the pods changing brown and opening; so that you should at that time look over the plants three or four times a week, gathering each time such of the seed-vessels as are ripe, which should be laid upon a paper to dry, and may then be put up until the season of sowing.

As the plants which arise from seeds, generally flower much better than offsets, those who would have these flowers in perfection, should annually sow their seeds.

PRIMROSE-TREE. See ONAGRA.

PRINOS. Lin. Gen. Plant. 398. Winterberry.

The CHARACTERS are,

The flower hath a permanent empalement of one leaf, which is cut into six small plain segments, and is permanent; it hath one wheel-shaped petal with no tube, cut into six plain segments; it hath six awl-shaped stamina shorter than the petal, terminated by obtuse summits, and an oval germen sitting upon the style, crowned by an obtuse stigma. The germen afterward turns to a round berry opening in three parts, including one hard seed.

This genus of plants is ranged in the first section of Linnæus's sixth class, which includes those plants whose flowers have six stamina and one style.

The SPECIES are,

1. PRINOS (*Verticillatus*) foliis longitudinaliter serratis. Lin. Sp. Plant. 330. *Prinos, or Winterberry, with leaves sawed lengthways.*

2. PRINOS (*Glaber*) foliis apice serratis. Lin. Sp. Plant. 330. *Prinos with leaves sawed at their points.*

The first sort grows naturally in Virginia, and other parts of North America. This rises with a shrubby stalk to the height of eight or ten feet, sending out many branches from the sides the whole length, which are garnished with spear-shaped leaves about three inches long, and one broad in the middle, terminating in acute points; they are of a deep green, veined on their under side, and sawed on their edges, having slender foot-stalks standing alternately on the branches. The flowers come out from the side of the branches, sometimes single, at others two or three at each joint; they have no tube, but are wheel-shaped, and cut into six parts; they have six awl-shaped erect stamina, terminated by obtuse summits, and an oval germen sitting upon the style, crowned by an obtuse stigma; these are succeeded by berries about the size of those of Holly, which turn purple when ripe. It flowers in July, and the seeds ripen in the winter.

The second sort grows naturally in Canada; this is of lower growth than the former. The leaves are shorter, and sawed at their points, but the flowers of this I have not seen.

They are propagated by seeds, which should be sown soon after they are ripe upon a bed of light earth, covering them about half an inch with the same sort of earth. The seeds which are so soon put into the ground, will many of them come up the following spring; whereas those which are kept longer out of the ground, will remain a whole year in the ground before the plants will appear in the same manner as the Holly, Hawthorn, and some others; therefore the ground should not be disturbed, if the plants do not come up the first year. When the young plants come up, they may be treated in the same manner as hath been directed for the American Hawthorns, for these are full as hardy, but they delight in a moist soil and a shady situation; for in hot land they make but little progress, and rarely produce any fruit.

PRIVET. See LIGUSTRUM.

PROTEA. Lin. Gen. Plant. 104. Conocarpodendron. Boerh. Ind. alt. 2. 195. Silver-tree.

The CHARACTERS are,

The flowers are collected in an oval head; they have one common imbricated scaly perianthium. The flower is of one petal, having a tube the length of the empalement; the brim is cut into four parts, which spread open, and are equal. It has four bristly stamina the length of the petal, terminated by incumbent summits, and a roundish germen

germen with an erect bristly style, crowned by an obtuse stigma. The germen afterward turns a roundish naked seed, sitting in a distinct cell of the cone.

This genus of plants is ranged in the first section of Linnæus's fourth class, which includes those plants whose flowers have four stamina and one style.

The SPECIES are,

1. PROTEA (*Conifera*) foliis lineari-lanceolatis integerrimis acutis glabris obliquatis. Lin. Sp. 138. *Protea with linear spear-shaped leaves, which are entire, sharp-pointed, smooth and oblique.*
2. PROTEA (*Argentea*) foliis lanceolatis obliquis acutis sparsis villosis-sericeis planis, floralibus verticillatis. Lin. Sp. 137. *Protea with spear-shaped oblique-pointed leaves, which are plain, silvery haired, and the flowers growing in whorls round the stalks.* Conocarpodendron foliis argenteis sericeis latissimis. Boerh. Ind. 2. p. 195. *Silver-tree.*
3. PROTEA (*Nitida*) foliis oblongo-ovatis hirsutis nitidis integerrimis. *Protea with oblong, oval, hairy, shining leaves, which are entire.* Lepidocarpodendron folio saligno lato, caule purpurascens. Boerh. Ind. alt. 2. 138. *Lepidocarpodendron, with a broad Willow leaf and a purplish stalk, otherwise called Wageboom.*

These plants are natives of the country near the Cape of Good Hope in Africa, where there is a great number of species. In the catalogue of the Leyden Garden, there are upwards of twenty sorts enumerated; not that they have them growing there, but they have good drawings of them, which were made in the country where they are natives. The three sorts here mentioned are what I had lately growing in the Chelsea Garden, but the third is now lost there.

These plants are many of them well figured in the index of the plants of the Leyden Garden, which was published by Dr. Boerhaave in 1719, by the titles of Lepidocarpodendron, Conocarpodendron, and Hypophyllocarpodendron; and, by some former writers on botany, this genus was intitled Scolymoccephalus, from the resemblance which the cones of these trees have to the head of an Artichoke.

As these plants are natives of the Cape of Good Hope, they are too tender to live abroad through the winter in England, but the first sort is hardy enough to live in a good green-house. This sort will grow to the height of ten or twelve feet, and may be trained up with a regular strait stem, and the branches will naturally form a regular large head. The leaves are long and narrow, of a shining silver colour; and as they remain the whole year, the plants make a fine appearance, when they are intermixed with others in the green-house. In the summer these may be placed in the open air in a sheltered situation; for, if they are exposed to winds, the plants will be torn, and rendered unsightly, nor will they make any progress in their growth. In warm weather they must be frequently but sparingly watered, and in cold weather this must not be too often repeated, lest it should rot their fibres.

The second sort hath a strong upright stalk covered with a purplish bark, dividing into several branches, which grow erect, garnished with broad, shining, silvery, spear-shaped leaves placed on every side, so the plants make a fine appearance, when intermixed with other exotics. This should be placed in an airy dry glass-case, where it may be protected from cold, and have as much light as possible, and in winter should have little water; this rises easily from seeds, which must be procured from the Cape of Good Hope, where it grows naturally. The seeds will sometimes remain in the ground six or eight months, and at other times the plants will appear in six weeks; therefore the best way is to sow the seeds in small pots filled with soft sandy loam, and plunge them into a moderate hot-bed; and, if the plants should not come up so soon as expected, the pots should remain in shelter till the following spring, when, if the seeds remain sound, the plants will come up. The pots in which the seeds are sown, should have but little wet, for moisture frequently causes them to

rot. When the plants appear, they should not be too tenderly treated, for they must not be kept too warm, nor should they have much wet; but in warm weather they must be exposed to the open air in a sheltered situation, and in winter protected from frost. The third sort I raised from seeds, which came from the Cape of Good Hope; these seeds were long and slender, very different in shape from those of the second sort, but the plants have some resemblance to those. The leaves are very silky and white; the stalks are purple, and grow erect, but have not as yet put out any branches.

The first sort may be propagated by cuttings, which should be cut off in April, just before the plants begin to shoot; these should be planted in small pots filled with light earth, and plunged into a moderate hot-bed, shading them from the sun, and now and then gently refreshing them with water, but it must be sparingly given, for much wet will rot them. These cuttings will put out roots by Midsummer, when they may be gently shaken out of the pots and parted, planting each in a separate small pot filled with light earth, and placed in a frame, where they may be shaded till they have taken new root; then they should be gradually inured to the open air, into which they should be removed, and treated in the same way as the old plants.

PRUNING OF TREES.

There is not any part of gardening which is of more general use than that of Pruning, and yet it is very rare to see fruit-trees skilfully managed. Almost every gardener will pretend to be a master of this business, though there are but few who rightly understand it; nor is it to be learned by rote, but requires a strict observation of the different manners of growth of the several sorts of fruit-trees, some requiring to be managed one way, and others must be treated in a quite different method, which is only to be known from carefully observing how each kind is naturally disposed to produce its fruit; for some sorts produce their fruit on the same year's wood, as Vines; others produce their fruit, for the most part, upon the former year's wood, as Peaches, Nectarines, &c. and others upon cufsons or spurs, which are produced upon wood of three, four, or five, to fifteen or twenty years old, as Pears, Plums, Cherries, &c. therefore, in order to the right management of fruit-trees, there should always be provision made to have a sufficient quantity of bearing wood in every part of the trees, and at the same time there should not be a superfluity of useless branches, which would exhaust the strength of the trees, and cause them to decay in a few years.

The reasons which have been laid down for Pruning of fruit-trees are as follows: First, To preserve trees longer in a vigorous bearing state; the second is, To render the trees more beautiful to the eye; and thirdly, To cause the fruit to be larger and better tasted.

1. It preserves a tree longer in a healthy bearing state; for by pruning off all superfluous branches, so that there are no more left upon the tree than are necessary, or that can be properly nourished, the root is not exhausted in supplying useless branches, which must afterwards be cut out, whereby much of the sap will be uselessly expended.

2. By skilful Pruning of a tree it is rendered much more pleasing to the eye; but here I would not be understood to be an advocate for a sort of Pruning, which I have seen too much practised of late, viz. the drawing a regular line against the wall, according to the shape or figure they would reduce the tree to, and cutting all the branches, strong or weak, exactly to the chalked line; the absurdity of which practice will soon appear to every one, who will be at the pains of observing the difference of those branches shooting the succeeding spring. All therefore that I mean by rendering a tree beautiful is, that the branches are all pruned according to their several strengths, and are nailed at equal distances, in proportion to the different sizes of their leaves and fruit, and that no

part

part of the wall (so far as the trees are advanced) be left unfurnished with bearing wood. A tree well managed, though it does not represent any regular figure, yet will appear very beautiful to the sight, when it thus dressed and nailed to the wall.

3. It is of great advantage to the fruit; for the cutting away all useless branches, and shortening all the bearing shoots according to the strength of the tree, will render the tree more capable to nourish those fruit and branches which are left remaining, so that the fruit will be much larger and better tasted. And this is the advantage which those trees against walls or espaliers have to such as are standards, and are permitted to grow as they are naturally inclined; for it is not their being trained either to a wall or espalier which renders their fruit so much better than standards, but because the roots have a less quantity of branches and fruit to nourish, and consequently their fruit will be larger and better tasted.

The reasons for Pruning being thus exhibited, the next thing is the method of performing it; but this being fully handled under the several articles of the different kinds of fruit, I shall not repeat it again in this place, and therefore shall only add some few general instructions, which are necessary to be understood, in order to the right management of fruit-trees.

There are many persons who suppose, that if their fruit-trees are but kept up to the wall or espalier during the summer season, so as not to hang in very great disorder, and in winter to get a gardener to prune them, it is sufficient, but this is a mistake; for the greatest care ought to be employed about them in the spring, when the trees are in vigorous growth, which is the only proper season to procure a quantity of good wood in the different parts of the tree, and to displace all useless branches as soon as they are produced, whereby the vigour of the tree will be entirely distributed to such branches only as are designed to remain, which will render them strong, and more capable to produce good fruit; whereas, if all the branches are permitted to remain which are produced, some of the more vigorous will attract the greatest share of the sap from the tree, whereby they will be too luxuriant for producing fruit, and the greatest part of the other shoots will be starved, and rendered so weak, as not to be able to produce any thing else but blossoms and leaves (as hath been before mentioned;) so that it is impossible for a person, let him be ever so well skilled in fruit-trees, to reduce them into any tolerable order by Winter-pruning only, if they are wholly neglected in the spring.

There are others who do not entirely neglect their trees during the summer season, as those before-mentioned, but yet do little more good to them by what they call Summer-pruning; for these persons neglect their trees at the proper season, which is in April and May, when their shoots are produced, and only about Midsummer go over them, nailing in all their branches, except such as are produced fore-right from the wall, which they cut out, and at the same time often shorten most of the other branches; all which is entirely wrong practice, for those branches, which are intended for bearing the succeeding year, should not be shortened during the time of their growth, which will cause them to produce one or two lateral shoots from the eyes below the place where they were stopped, which shoots will draw much of the strength from the buds of the first shoot, whereby they are often flat, and do not produce their blossoms; and, if those two lateral shoots are not entirely cut away at the Winter-pruning, they will prove injurious to the tree, as the shoots which these produce, will be what the French call water shoots; and in suffering those luxuriant shoots to remain upon the tree until Midsummer before they are displaced, they will exhaust a great share of the nourishment from the other branches (as was before observed;) and, by shading the fruit all the spring season, when they are cut away, and the other branches fastened to the wall, the fruit, by be-

ing so suddenly exposed, will receive a very great check, which will cause their skins to grow tough, and thereby render them less delicate. This is to be chiefly understood of stone fruit and Grapes, but Pears and Apples being much hardier, suffer not so much, though it is a great disadvantage to those also to be thus managed.

It must also be remarked, that Peaches, Nectarines, Apricots, Cherries, and Plums, are always in the greatest vigour, when they are the least maimed by the knife; for where these trees have large amputations, they are very subject to gum and decay; so that it is certainly the most prudent method carefully to rub off all useless buds when they are first produced, and pinch others, where new shoots are wanted to supply the vacancies of the wall, by which management trees may be so ordered, as to want but little of the knife in Winter-pruning, which is the surest way to preserve these trees healthful, and is performed with less trouble than the common method.

The management of Pears and Apples is much the same with these trees in summer, but in winter they must be very differently pruned; for as Peaches and Nectarines for the most part produce their fruit upon the former year's wood, therefore they must have their branches shortened according to their strength, in order to produce new shoots for the succeeding year; so Pears, Apples, Plums, and Cherries, on the contrary, producing their fruit upon cufsons or spurs, which come out of the wood of five, six, or seven years old, should not be shortened, because thereby those buds, which were naturally disposed to form these cufsons or spurs, would produce wood branches, whereby the trees would be filled with wood, but never produce much fruit; and as it often happens that the blossom buds are first produced at the extremity of the last year's shoot, by shortening the branches the blossoms are cut away, which should always be carefully avoided.

There are several authors who have written on the subject of Pruning in such a prolix manner, that it is impossible for a learner to understand their meaning. These have described the several sorts of branches which are produced on fruit-trees; as wood branches, fruit branches, irregular branches, false branches, and luxuriant branches, all which they assert every person, who pretends to Pruning, should distinguish well; whereas there is nothing more in all this but a parcel of words to amuse the reader, without any real meaning; for all these are comprehended under the description already given of luxuriant or useless branches, and such as are termed useful or fruit-bearing branches; and, where due care is taken in the spring of the year to displace these useless branches (as was before directed,) there will be no such thing as irregular, false, or luxuriant branches at the Winter-pruning; therefore it is to no purpose to amuse people with a cant of words, which, when fully understood, signify just nothing at all.

But since I have explained the different methods of Pruning the several sorts of fruits under the respective articles, I shall forbear repeating it again in this place, but shall only give some general hints for the Pruning of standard fruit-trees, and so conclude.

First, you should never shorten the branches of these trees, unless it be where they are very luxuriant, and grow irregular on one side of the tree, attracting the greatest part of the sap of the tree, whereby the other parts are unfurnished with branches, or rendered very weak; in which case the branch should be shortened down as low as is necessary, in order to obtain more branches, to fill up the hollow of the trees; but this is only to be understood of Pears and Apples, which will produce shoots from wood of three, four, or more years old, whereas most sorts of stone fruit will gum and decay after such amputations.

But from hence I would not have it understood, that I would direct the reducing of these trees into an exact spherical figure, since there is nothing more detestable than to see a tree (which should be permitted

to grow as it is naturally disposed, with its branches produced at proportionable distances, according to the size of the fruit,) by endeavouring to make it exactly regular at its head, so crowded with small weak branches as to prevent the air from passing between them, which will render the trees incapable to produce fruit. All that I intend by this stopping of luxuriant branches, is only when one or two such happen on a young tree, where they entirely draw all the sap from the weaker branches, whereby they starve them, then it is proper to use this method, which should be done in time, before they have exhausted the roots too much.

Whenever this happens to stone fruit, which suffer much more by cutting than the former sorts, it should be remedied by stopping or pinching those shoots in the spring, before they have obtained too much vigour, which will cause them to push out side-branches, whereby the sap will be diverted from ascending too fast to the leading branch (as hath been directed for wall-trees,) but this must be done with caution.

You must also cut out all dead or decayed branches, which cause their heads to look very ragged, especially at the time when the leaves are upon the tree; these being destitute of them, have but a despicable appearance; besides, these will attract noxious particles from the air, which are injurious to the trees, therefore the sooner they are cut out the better. In doing of this you should observe to cut them close down to the place where they were produced, otherwise that part of the branch left will decay, and prove equally hurtful to the tree; for it seldom happens, when a branch begins to decay, that it does not die quite down to the place where it was produced; and, if any part is permitted to remain long uncut, does often infect some of the other parts of the tree. If the branches are large which you cut off, it will be very proper, after having smoothed the cut part exactly even with a knife, chisel, or hatchet, to put on a plaster of grafting clay, which will prevent the wet from soaking into the tree at the wounded part.

All such branches as run cross each other should also be cut out, for these not only occasion a confusion in the head of the tree, but, by lying over each other, rub off their bark by their motion, and very often occasion them to canker, to the great injury of the tree; and on old trees (especially Apples) there are often young vigorous shoots from the old branches near the trunk, which grow upright into the head of the trees. These therefore should carefully be cut out every year, lest, by being permitted to grow, they fill the tree too full of wood; which should always be guarded against, since it is impossible for such trees to produce so much, or so good fruit as those, whose branches grow at a farther distance, whereby the sun and air freely pass between them in every part of the tree.

These are the general directions which are proper to be given in this place, since not only the particular methods, but also the proper seasons for Pruning all the different kinds of fruit, are fully exhibited under their several articles.

PRUNELLA. Lin. Gen. Plant. 735. Tourn. Inst. R. H. 84. Self-heal.

The CHARACTERS are,

The flower hath a permanent empalement of one leaf, with two lips; the upper is plain, broad, and slightly indented in three parts; the under is erect, acute-pointed, and cut into two segments; the flower is of the ringent kind, having a short cylindrical tube with oblong chaps; the upper lip is concave, nodding, and entire; the under is reflexed, trifid, and obtuse. It hath four awl-shaped stamens, two of which are longer than the other, with simple summits inserted to the stamens, and four germen with a slender style, inclining to the upper lip of the flower, crowned by an indented stigma. The germen afterward become four seeds, sitting in the empalement of the flower. This genus of plants is ranged in the first section of Linnæus's fourteenth class, intitled Didynamia Gym-

nospermia, from the flowers having two long and two short stamens, which are succeeded by four naked seeds sitting in the empalement.

The SPECIES are,

1. **PRUNELLA** (*Vulgaris*) foliis omnibus ovato-oblongis petiolatis. Lin. Sp. Plant. 837. *Self-heal with all the leaves oblong, oval, having foot-stalks.* Brunella major, folio non dissecto. C. B. P. 260. *Greater Self-heal with entire leaves.*
2. **PRUNELLA** (*Laciniata*) foliis ovato-oblongis petiolatis, supremis quatuor lanceolatis dentatis. Lin. Sp. Plant. 837. *Self-heal with oblong oval leaves having foot-stalks, whose upper part of the leaves are cut into four segments.* Brunella folio laciniato. C. P. B. 261. *Self-heal with cut leaves.*
3. **PRUNELLA** (*Hyssopifolia*) foliis lanceolato-linearibus ciliatis subsessilibus. Sauv. Monsp. 141. *Self-heal with linear spear-shaped leaves sitting close to the stalks.* Brunella Hyssopifolia. C. B. P. 261. *Self-heal with an Hyssop leaf.*
4. **PRUNELLA** (*Canadensis*) foliis linearibus sessilibus glabris, internodiis longissimis, spicis interruptis. *Self-heal with linear smooth leaves sitting close to the stalks, the spaces between the joints very long, and the spikes of flowers broken.*
5. **PRUNELLA** (*Sulphurea*) foliis oblongis pinnato-incisis villosis, infimis petiolatis, summis sessilibus. *Self-heal with oblong hairy leaves cut in form of winged leaves, the lower having foot-stalks, but the upper sit close to the stalks.* Brunella folio laciniato, flore sulphureo elegantissimo. Boerh. Ind. alt.
6. **PRUNELLA** (*Caroliniana*) foliis lanceolatis integerrimis, infimis petiolatis, summis sessilibus, internodiis prælongis. *Self-heal with entire spear-shaped leaves, the lower having long foot-stalks, but the upper sit close to the stalk, and the joints of the stalk are distant.* Brunella Caroliniana magno flore dilute cæruleo, internodiis prælongis. Act. Phil. N° 395.
7. **PRUNELLA** (*Nova Anglia*) foliis oblongis mucronatis petiolatis, spicis florum crassissimis. *Self-heal with oblong pointed leaves having foot-stalks, and very thick spikes of flowers.* Brunella Novæ Angliæ major, foliis longius mucronatis. Hort. Chelf.

There are some other varieties, if not distinct species, of this genus, than are here enumerated; but it is difficult to determine the species, some of them approaching so near to others, as scarcely to be distinguished from them; the first sort grows naturally in England, and is used in medicine; the dried herb is frequently imported from Switzerland, among those which are called vulnerary herbs, of which this is supposed to be one of the best.

The second sort is less common than the first, and of this there are two or three varieties, which some writers on botany have enumerated as distinct species; one of these has narrower leaves, which are cut into finer segments; this is titled Verbennæ folio; but as the plants raised from the same seeds are very subject to vary, so it is difficult to determine if it is really a different plant.

The third sort grows naturally in Italy and the south of France; the leaves of this sort are narrower than those of either of the former, and are covered on both sides with fine hairs, and have very short foot-stalks; the spikes of flowers are slender, and are of a pale blue colour; this flowers in July, and the seeds ripen in the autumn.

The fourth sort grows naturally in North America; the leaves of this are pretty long and narrow, shaped like those of the third sort, but are smooth, sitting close to the stalk; the spikes of flowers are longer, and the whorls of flowers are separated.

It is uncertain where the fifth sort grows naturally, though I think Dr. Boerhaave, late professor of botany at Leyden, told me, he received the seeds from Austria; the stalks of this sort generally spread open, and prostrate near the ground; these are hairy, and garnished with oblong leaves, which are also hairy, and cut on their edges somewhat like winged leaves; the stalks are terminated by close spikes of flowers, of a sulphur

a sulphur colour; this flowers and ripens its seeds about the same time with the former.

The sixth sort grows naturally in Carolina, from whence I received the seeds; the stalks of this sort rise more than eight inches high, and are garnished with oblong leaves; those toward the bottom have long foot-stalks, but those on the top sit close to the stalks; the spikes of flowers are large and entire; they are of a pale blue colour, appearing at the same time with those of the two former sorts, and the seeds ripen in September.

The seeds of the seventh sort were first sent me from New England; but since then, I have received more from Virginia; so I suppose the plant grows naturally in several parts of North America. The leaves of this are large, smooth, and end in sharp points; the stalks are brown; they rise eight or nine inches high, and are terminated by thick spikes of blue flowers, which appear in July, and are succeeded by seeds which ripen in September.

These plants are seldom cultivated in any gardens, unless by such who have an inclination for the study of botany, as they are plants which make little appearance; however, those who are desirous to cultivate any of the species, may do it by sowing the seeds in the autumn, soon after they are ripe, when they will succeed much sooner, and with greater certainty, than if they are sown in the spring; for the seeds which are sown at that season seldom grow till a twelve-month after, and sometimes do not succeed. When the plants come up, they require no other care but to thin them where they are too close, and keep them clean from weeds. They will thrive upon any soil or situation, but best on a moist soil and a shady situation, where, if the ground is not too good, they will live three or four years, but in rich land they seldom continue longer than two years; therefore to continue the species, it will be proper to sow their seeds every year, or every other year.

PRUNUS. Tourn. Inst. R. H. 622. tab. 398. Lin. Gen. Plant. 546. The Plum-tree.

The CHARACTERS are,

The flower hath a bell-shaped empalement of one leaf, cut into five parts; it hath five large roundish petals which spread open, and are inserted in the empalement; and from twenty to thirty stamina, which are near as long as the petals, and are also inserted in the empalement, terminated by twin summits. It has a roundish germen, supporting a slender style, crowned by an orbicular stigma. The germen afterward turns to a roundish fruit, inclosing a nut of the same form.

This genus of plants is ranged by Dr. Linnæus in the first section of his twelfth class, which includes those plants whose flowers have many stamina inserted to the empalement; and has joined to this genus the Padus, Cerasus, and Armeniaca, making them only species of the same genus; which, according to his system of ranging the plants, may be allowed; yet in a treatise of this kind it would rather puzzle the practitioners of the art of gardening to follow him, for which reason I have kept them separate.

I shall not abridge this article, but continue to mention the varieties of this fruit which are cultivated in the English gardens.

The SPECIES are,

1. PRUNUS (*Faunhâtive*) fructu parvo præcoci. *The white Primordian*. This is a small, longish, white Plum, of a clear yellow colour, covered over with a white floss, which easily wipes off. It is a pretty good bearer, and, for its coming very early, one tree may have a place in a large garden of fruit, but it is mealily, and has little flavour. This ripens the middle or latter end of July.
2. PRUNUS (*Damas Noir*) fructu magno crasso subacido. Tourn. *The early Damask, commonly called the Morocco Plum*. This is a middle sized Plum, of a round shape, divided with a furrow in the middle (like Peaches.) The outside is of a dark black colour, covered with a light Violet bloom; the flesh is yellow, and parts

from the stone. It ripens the end of July, and is esteemed for its goodness.

3. PRUNUS (*Small Damas*) fructu parvo dulci atro-cæruleo. Tourn. *The little black Damask Plum*. This is a small black Plum covered with a light Violet bloom. The juice is richly sugared; the flesh parts from the stone, and it is a good bearer. Ripe the beginning of August.
4. PRUNUS (*Gross Damas*) fructu magno dulci atro-cæruleo. Tourn. *Gross Damas Violet de Tours, i. e. great Damask Violet of Tours*. This is a pretty large Plum, inclining to an oval shape. The outside is of a dark blue covered with a Violet bloom; the juice is richly sugared; the flesh is yellow, and parts from the stone. Ripe in August.
5. PRUNUS (*Orleans*) fructu rotundo atro rubente. *The Orleans Plum*. The fruit is so well known to almost every person, that it is needless to describe it; it is a very plentiful bearer, which has occasioned its being so generally planted by those persons who supply the markets with fruit, but it is an indifferent Plum. It ripens in August.
6. PRUNUS (*Fotheringham*) fructu oblongo atro-rubente. *The Fotheringham Plum*. This fruit is somewhat long, deeply furrowed in the middle. The flesh is firm, and parts from the stone; the juice is very rich. This ripens in August.
7. PRUNUS (*Perdigron*) fructu nigro, carne durâ. Tourn. *The Perdigron Plum*. This is a middle-sized Plum of an oval shape. The outside is of a very dark colour, covered over with a Violet bloom; the flesh is firm, and full of an excellent rich juice. This is greatly esteemed by the curious. Ripe in August.
8. PRUNUS (*Violet Perdigron*) fructu magno è violaceo rubente suavissimo saccharato. Tourn. *The Violet Perdigron Plum*. This is a large fruit, rather round than long, of a bluish red colour on the outside. The flesh is of a yellowish colour, pretty firm, and closely adheres to the stone; the juice is of an exquisite rich flavour. This ripens in August.
9. PRUNUS (*White Perdigron*) fructu ovato ex albo flavescente. *The white Perdigron Plum*. This is a middling Plum, of an oblong figure. The outside is yellow, covered with a white bloom; the flesh is firm, and well tasted. It is a very good fruit to eat raw, or for sweetmeats, having an agreeable sweetness mixed with an acidity. It ripens the end of August.
10. PRUNUS (*Imperial*) fructu ovato magno rubente. Tourn. *The red imperial Plum, sometimes called the red Bonum Magnum*. This is a large oval-shaped fruit, of a deep red colour, covered with a fine bloom. The flesh is very dry, and very indifferent to be eaten raw, but is excellent for making sweetmeats; this is a great bearer. Ripe in September.
11. PRUNUS (*Bonum Magnum*) fructu ovato magno flavescente. Tourn. *White imperial Bonum Magnum, white Holland, or Mogul Plum*. This is a large oval-shaped fruit, of a yellowish colour, powdered over with a white bloom. The flesh is firm, and adheres closely to the stone; the juice is of an acid taste, which renders it unpleasant to be eaten raw, but it is very good for baking or sweetmeats. It is a great bearer, and is ripe the middle of September.
12. PRUNUS (*Cheston*) fructu ovato cæruleo. *The Cheston Plum*. This is a middle-sized fruit of an oval figure. The outside is of a dark blue, powdered over with a Violet bloom; the juice is rich, and it is a great bearer. Ripe the middle of September.
13. PRUNUS (*Apricot*) fructu maximo rotundo flavo & dulci. Tourn. *Prune d'Abricot, i. e. the Apricot Plum*. This is a large round fruit of a yellow colour on the outside, powdered over with a white bloom. The flesh is firm and dry, of a sweet taste, and comes clean from the stone. This ripens the end of September.
14. PRUNUS (*Maitre Claud*) fructu subrotundo, ex rubro & flavo mixto. *The Maitre Claud*. Although this name is applied to this fruit, yet it is not what the French

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French so call. This a middle-sized fruit, rather round than long, of a fine mixed colour between red and yellow. The flesh is firm, parts from the stone, and has a delicate flavour. Ripe the end of September.

15. PRUNUS (*Diaprée*) fructu rubente dulcissimo. Tourn. *La Rochecourbon, or Diaprée rouge, i. e. the red Diaper Plum.* This is a large round fruit, of a reddish colour, powdered over with a Violet bloom; the flesh adheres closely to the stone, and is of a very high flavour. Ripe the end of August.

16. PRUNUS fructu rotundo flavescente. *La petite Reine Claude, i. e. the little Queen Claudia.* This is a small round fruit, of a whitish yellowish colour, powdered over with a pearl-coloured bloom; the flesh is firm and thick, quits the stone, and its juice is richly sugared. Ripe the end of August.

17. PRUNUS fructu rotundo nigro-purpureo majori dulci. Tourn. *Myrobalan Plum.* This is a middle-sized fruit, of a round shape; the outside is a dark purple, powdered over with a Violet bloom; the juice is very sweet. It is ripe the end of August.

18. PRUNUS fructu rotundo è viridi flavescente, carne duro suavissimo. *La grosse Reine Claude, i. e. the large Queen Claudia, by some the Dauphiny.* At Tours it is called the Abricot verd, i. e. green Apricot; at Rouen, Le verte bonne, i. e. the good green; and in other places, Damas verd, i. e. green Damask, or Tromp-valet, the Servants Cheat. This is one of the best Plums in England; it is of a middle size, round, and of a yellowish green colour on the outside; the flesh is firm, of a deep green colour, and parts from the stone; the juice has an exceeding rich flavour, and it is a great bearer. Ripe the middle of September. This Plum is confounded by most people in England, by the name of Green Gage; but this is the sort which should be chosen, although there are three or four different sorts of Plums generally sold for it, one of which is small, round, and dry; this quits the stone, and is later ripe, so not worth preserving.

19. PRUNUS fructu amygdalino. Tourn. *Rognon de Coq, i. e. Cock's Testicles.* This is an oblong fruit, deeply furrowed in the middle, so as to resemble the testicles; it is of a whitish colour on the outside, streaked with red; the flesh of it adheres firmly to the stone, and it is late ripe.

20. PRUNUS fructu rotundo flavo dulcissimo. *Drap d'Or, i. e. the Cloib of Gold Plum.* This is a middle sized fruit, of a bright yellow colour, spotted or streaked with red on the outside; the flesh is yellow, and full of an excellent juice. It is a plentiful bearer, and ripens about the middle of September.

21. PRUNUS fructu cerei coloris. Tourn. *Prune de Sainte Catharine, i. e. St. Catharine Plum.* This is a large oval-shaped fruit, somewhat flat; the outside is of an amber colour, powdered over with a whitish bloom, but the flesh is of a bright yellow colour, is dry and firm, adheres closely to the stone, and has a very agreeable sweet taste. This ripens at the end of September, and is very subject to dry upon the tree, when the autumn proves warm and dry. This makes fine sweetmeats, and is a plentiful bearer.

22. PRUNUS fructu ovato rubente dulci. *The Royal Plum.* This is a large fruit of an oval shape, drawing to a point next the stalk; the outside is of a light red colour, powdered over with a whitish bloom; the flesh adheres to the stone, and has a fine sugary juice. This ripens the middle of September.

23. PRUNUS fructu parvo ex viridi flavescente. Tourn. *La Mirabelle.* This is a small round fruit, of a greenish yellow on the outside; the flesh parts from the stone, is of a bright yellow colour, and has a fine sugary juice. This is a great bearer, ripens the end of August, and is excellent for sweetmeats.

24. PRUNUS Brigonienſis, fructu suavissimo. Tourn. *Prune de Brignole, i. e. the Brignole Plum.* This is a large oval-shaped fruit, of a yellowish colour, mixed with red on the outside; the flesh is of a bright yellow colour, is dry, and of an excellent rich flavour.

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This ripens the middle of September, and is esteemed the best Plum for sweetmeats yet known.

25. PRUNUS fructu magno è violaceo rubente serotino. Tourn. *Imperatrice, i. e. the Empress.* This is a large round fruit, of a Violet red colour, very much powdered with a whitish bloom; the flesh is yellow, cleaves to the stone, and is of an agreeable flavour. This ripens about the beginning of October.

26. PRUNUS fructu ovato maximo flavo. Tourn. *Prune de Monsieur, i. e. Monsieur's Plum.* This is sometimes called the Wentworth Plum. It is a large oval-shaped fruit, of a yellow colour both within and without, very much resembling the Bonum Magnum, but the flesh of this parts from the stone, which the other doth not. This ripens towards the latter end of September, and is very good to preserve, but the juice is too sharp to be eaten raw. It is a great bearer.

27. PRUNUS fructu majori rotundo rubro. Tourn. *Prune Cerizette, i. e. the Cherry Plum.* This fruit is commonly about the size of the Ox-heart Cherry, is round, and of a red colour; the stalk is long like that of a Cherry, which this fruit so much resembles, as not to be distinguished therefrom at some distance. The blossoms of this tree come out very early in the spring, and being tender, are very often destroyed by cold, but it affords a very agreeable prospect in the spring; for these trees are generally covered with flowers, which open about the same time as the Almonds; so that when they are intermixed therewith, they make a beautiful appearance before many other sorts put out; but by this blossoming so early, there are few years that they have much fruit.

28. PRUNUS fructu albo oblongiusculo acido. Tourn. *The white Pear Plum.* This is a good fruit for preserving, but is very unpleasant if eaten raw; it is very late ripe, and seldom planted in gardens, unless for stocks to bud some tender sorts of Peaches upon, for which purpose it is esteemed the best amongst all the sorts of Plums.

29. PRUNUS Mytellinum. Park. *The Muscle Plum.* This is an oblong flat Plum, of a dark red colour; the stone is large, and the flesh but very thin and not well tasted, so that its chief use is for stocks, as the former.

30. PRUNUS fructu parvo violaceo. *The St. Julian Plum.* This is a small fruit, of a dark Violet colour, powdered over with a mealy bloom; the flesh adheres closely to the stone, and in a fine autumn will dry upon the tree. The chief use of this Plum is for stocks, to bud the more generous kinds of Plums and Peaches upon; as also for the Bruxelles Apricot, which will not thrive so well upon any other stock.

31. PRUNUS sylvestris major. J. B. *The black Bullace-tree.* This grows wild in the hedges in divers parts of England, and is rarely cultivated in gardens.

32. PRUNUS sylvestris, fructu majore albo. Raii Syn. *The white Bullace-tree.* This grows wild as the former, and is seldom cultivated in gardens.

33. PRUNUS sylvestris. Ger. Emac. *The Black-thorn, or Sloe-tree.* This is very common in the hedges almost every where; the chief use of this tree is to plant for hedges, as White-thorn, &c. and being of quick growth, is very proper for that purpose.

All the sorts of Plums are propagated by budding or grafting them upon stocks of the Muscle, White-Pear, St. Julian, Bonum Magnum, or any other sorts of free-shooting Plums. The manner of raising these stocks hath been already exhibited under the article of NURSERIES, therefore need not be repeated again in this place; but I would observe, that budding is much preferable to grafting for these sorts of stone fruit-trees, which are very apt to gum, wherever there are large wounds made on them.

The trees should not be more than one year's growth from the bud when they are transplanted, for if they are older, they seldom succeed so well, being very subject to canker; or if they take well to the ground, commonly produce only two or three luxuriant branches, therefore it is much more advisable to chuse young plants.

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The manner of preparing the ground (if for walls) is the same as for Peaches; as is also pruning the roots and planting, therefore I shall forbear repeating it again. The distance which these trees should be planted at, must not be less than twenty-four feet against high walls; and if the wall is low, they should be placed thirty feet asunder.

Plums should have a middling soil, neither too wet and heavy, nor over light and dry, in either of which extremes they seldom do so well; and those sorts which are planted against walls, should have an east or south-east aspect, which is more kindly to these fruits than a full south aspect, on which they are subject to shrivel, and be very dry; and many sorts will be extreme mealy, if exposed too much to the heat of the sun; but most sorts will ripen extremely well on espaliers, if rightly managed.

There are some persons who plant Plums for standards, in which method some of the ordinary sorts will bear very well; but then the fruit will not be near so fair as those produced on espaliers, and will be more in danger of being bruised or blown down by strong winds. The distance of placing them for espaliers must be the same as against walls, as must also their pruning and management; so that whatever may be hereafter mentioned for one, should be likewise understood for both.

Plums do not only produce their fruit upon the last year's wood, but also upon cufons or spurs, which come out of wood that is many years old; so that there is not a necessity of shortening the branches, in order to obtain new shoots annually, in every part of the tree (as in Peaches, Nectarines, &c. hath been directed) since the more these trees are pruned, the more luxuriant they grow, until the strength of them is exhausted, and then they gum and spoil; therefore the safest method to manage these trees is, to lay in their shoots horizontally, as they are produced, at equal distances, in proportion to the length of their leaves; and where there is not a sufficient quantity of branches to fill up the vacancies of the tree, there the shoots may be pinched the beginning of May (in the manner as hath been directed for Peaches, &c.) which will cause them to produce some lateral branches to supply those places; and during the growing season, all fore-right shoots should be displaced, and such as are to remain must be regularly trained in to the wall or espalier, which will not only render them beautiful, but also give to each part of the trees an equal advantage of sun and air; and hereby the fruit will be always kept in a ductile growing state, which they seldom are, when overshadowed with shoots some part of the season, and then suddenly exposed to the air, by taking off, or training those branches in their proper position.

With thus carefully going over these trees in the growing season, there will be but little work to do to them in winter; for when the branches are shortened, the fruit is cut away, and the number of shoots increased; for whenever a branch is shortened, there are commonly two or more shoots produced from the eyes immediately below the cut; so that by thus unskilfully pruning, many persons crowd their trees with branches, and thereby render what little fruit the trees produce, very small and ill-tasted; which is very commonly found in too many gardens, where the manager, perhaps, thinks himself a complete master of his business; for nothing is more common than to see every branch of a fruit-tree pass the discipline of the knife, however disagreeable it be to several sorts of fruits. And it is common to see these trees planted at the distance of fourteen or sixteen feet, so that the walls are in a few years covered with branches; and then all the shoots are cut and mangled with the knife, so as to appear like a stumped hedge, and produce little fruit; therefore the only way to have Plum-trees in good order, is to give them room, and extend their branches at full length.

Those few rules before laid down, will be sufficient, if due observation be joined therewith, to instruct any

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person in the right management of these sorts of fruit-trees; therefore I shall not say any more on that subject, lest by multiplying instructions, it may render it more obscure to a learner.

PSEUDOACACIA. See ROBINIA.

PSEUDODICTAMNUS. See MARRUBIUM.

PSIDIUM. Lin. Gen. Plant. 541. Guajava. Tourn. Inst. R. H. 660. tab. 443. The Guava-tree.

The CHARACTERS are,

The flower has a bell-shaped empalement of one leaf, divided into five oval points at the top. It hath five oval, concave, spreading petals, indented in the empalement, with a great number of stamina which are shorter than the petals, and are inserted in the empalement, terminated by small summits. It has a roundish germen situated under the flower, supporting a long awl-shaped style, crowned by a simple stigma; the germen afterward becomes a large oval fruit crowned by the empalement, inclosing a great number of small seeds.

This genus of plants is ranged in the first section of Linnæus's twelfth class, which includes those plants whose flowers have many stamina which are inserted in the empalement, and one style.

The SPECIES are,

1. PSIDIUM (*Pyriferum*) foliis ovato-lanceolatis, pedunculis unifloris: *Psidium* with oval spear-shaped leaves, and one flower on each foot-stalk. Guajava alba dulcis. Hort. Amst. vol. i. p. 121. *The sweet white Guava.*
2. PSIDIUM (*Pomiferum*) foliis ovatis, pedunculis trifloris. *Psidium* with oval leaves and foot-stalks with three flowers. Guajabo pomifera Indica, pomis rotundis. C. B. P. 437. *The red Guava.*

Both these sorts grow naturally in the East and West-Indies; and there is also a third with a large white fruit, but I do not know whether this is a variety of the common Guava, or of that with the small white fruit; though I am inclined to believe it is the former, because I have raised many plants from the seeds of the small white Guava, which have produced fruit in the Chelsea Garden, and have not varied from their parent plant.

The common red Guava hath a pretty thick trunk, which rises twenty feet high, covered with a smooth bark, and divides into many branches toward the top; these are angular, and garnished with oval leaves two inches and a half long, and one inch and a half broad in the middle, rounded at both ends; they have a strong midrib, and many veins running toward the sides, of a light green colour, standing opposite upon very short foot-stalks. From the wings of the leaves the flowers come out upon foot-stalks, about an inch and a half long; they are composed of five large, roundish, concave, white petals, which are inserted in the empalement, and within these are a great number of stamina which are shorter than the petals, terminated by small summits; these stamina are also inserted in the empalement. Under the flower is situated a roundish germen, supporting a very long awl-shaped style, crowned by a simple stigma. After the flower is past, the germen becomes a large oval fruit, shaped like a Pomegranate, having one cell, crowned by the empalement of the flower, and filled with small seeds; the fruit, when ripe, has an agreeable odour. They are much eaten in the West-Indies, both by men and beasts; and the seeds, which pass whole through the body, and are voided with the excrement grow, whereby the trees are spread over the ground where they are permitted to grow. This fruit is very astringent, and nearly of the same quality with Pomegranate, so should be avoided by those persons who are subject to be costive.

The large white sort grows naturally in the islands of the West-Indies, and is often found intermixed with the former, so is supposed to be only an accidental variety arising from the same seeds. This differs from the former in the colour of the midrib of the leaves, which in this are pale, but those of the former are red. The flowers and fruit of this are larger, and the inside of the fruit is white.

The leaves of the small white Guava are like those of the larger, but the branches of the tree are not so angular; the flowers are much smaller, and the fruit is no larger than a middling Gooseberry, but when ripe has a very strong aromatic flavour. This flowers in June, and the fruit ripens in autumn.

These plants are propagated by seeds, which must be procured from the countries where they naturally grow; if these are brought over in the entire fruit, gathered full ripe, the seeds will more certainly succeed; these should be sown in pots filled with rich kitchen-garden earth, and plunged into a hot-bed of tanners bark, giving them water from time to time as the earth dries; in about six weeks the plants will appear (if the seeds are good) and must have free air admitted to them in proportion to the warmth of the season; when the plants have obtained strength enough to be removed, they should be each planted in a small pot, filled with the like rich earth, and plunged into a fresh hot-bed, shading them from the sun until they have taken new root; then they should have a large share of free air admitted to them every day in warm weather, to prevent their drawing up weak; they must also be frequently refreshed with water in summer. When the plants have filled these small pots with their roots, they should be shaken out and their roots pared, then put into larger pots filled with the same sort of earth, and plunged into the hot-bed again, where they should remain till autumn, when they must be plunged into the tan-bed in the stove: during the winter they should have a moderate warmth, and not too much water, and in summer they will require plenty of wet, and in hot weather a great share of air; with this management the plants will produce flowers and fruit the third year, and may be continued a long time.

PSORALEA. Lin. Gen. Plant. 801. Flor. Leyd. Prod. 372. Barba Jovis. Boerh. Ind. alt. 2. 40.

The CHARACTERS are,

The empalement of the flower is of one leaf, cut into five parts, the lower segments being twice the length of the other. The flower is of the butterfly kind, it hath five petals; the standard is roundish, and indented at the top. The wings are small, obtuse, and moon-shaped; the keel is moon-shaped, and composed of two petals. It hath nine stamens joined together, and one bristly stamen standing separate, terminated by roundish summits, with a linear germen supporting an awl-shaped rising style, crowned by an obtuse stigma. The germen afterward turns to a slender compressed pod, inclosing one kidney-shaped seed.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which includes those plants whose flowers have ten stamens joined in two bodies.

The SPECIES are,

1. **PSORALEA (Pinnata)** foliis pinnatis, floribus axillaribus. Hort. Upsal. 225. *Psoralea with winged leaves, and flowers proceeding from the sides of the stalks.* Barba Jovis Africana, foliis viridibus pinnatis, flore cæruleo. Boerh. Ind. alt. 2. p. 40. *African Jupiter's Beard, with green winged leaves and a blue flower.*
2. **PSORALEA (Hirta)** foliis ternatis foliolis ovatis, caule fruticoso hirsuto, floribus spicatis terminalibus. *Psoralea with trifoliate oval leaves, a hairy shrubby stalk, and flowers growing in spikes terminating the branches.* Barba Jovis Americana frutescens, foliis subrotundis, floribus spicatis purpureis. Houst. MSS. *Shrubby American Jupiter's Beard, with roundish leaves and purple spiked flowers.*
3. **PSORALEA (Procumbens)** foliis pinnatis argenteis, caulibus procumbentibus, floribus axillaribus. *Psoralea with silvery winged leaves, trailing stalks, and flowers proceeding from the sides of the stalks.* Barba Jovis Malabarica annua procumbens argentea, floribus minimis purpureis. Ed. Prior. *Annual, trailing, silvery Jupiter's Beard of Malabar, with the least purple flowers.*
4. **PSORALEA (Scandens)** foliis pinnatis, caule ramoso scandente, floribus alaribus sessilibus. *Psoralea with winged leaves, a climbing branching stalk, and flowers sitting close at the wings of the stalk.* Barba Jovis Ame-

ricana scandens, floribus cæruleis, ad alas foliorum conglomeratis. Houst. MSS. *Climbing American Jupiter's Beard, with blue flowers growing in clusters at the wings of the leaves.*

5. **PSORALEA (Capitata)** foliis ternatis, caule fruticoso ramosissimo, floribus capitatis pedunculatis alaribus. *Psoralea with trifoliate leaves, a very branching shrubby stalk, and flowers growing in heads, which have foot-stalks proceeding from the wings of the leaves.* Barba Jovis Americana frutescens hirsuta, floribus cæruleis conglomeratis. Houst. MSS. *Shrubby, hairy, American Jupiter's Beard, with blue clustered flowers.*
6. **PSORALEA (Annuæ)** foliis pinnatis, spicis terminalibus. Lin. Sp. Plant. 764. *Psoralea with winged leaves, and flowers growing in spikes terminating the branches.* Barba Jovis Americana annua, humilis, ramosissima, floribus cæruleis spicatis. Houst. MSS. *Low, very branching, annual, American Jupiter's Beard, with blue spiked flowers.*
7. **PSORALEA (Humilis)** foliis pinnatis, foliolis rotundioribus villosis, floribus capitatis alaribus terminalibusque, caule fruticoso. *Psoralea with winged leaves having hairy round lobes, flowers growing in heads from the wings of the leaves, and at the end of the branches, and a shrubby stalk.* Barba Jovis Americana, humilis rotundifolia & villosa, flore vario. Houst. MSS. *Low American Jupiter's Beard, with a round hairy leaf and a variable flower.*
8. **PSORALEA (Bituminosa)** foliis omnibus ternatis, pedunculis capitatis. Hort. Upsal. 225. *Psoralea with trifoliate leaves, and flowers growing in heads.* Trifolium bitumen redolens. C. B. P. 327. *Trefoil with a bituminous scent.*
9. **PSORALEA (Angustifolia)** foliis ternatis, foliolis ovato-lanceolatis, floribus capitatis. *Psoralea with trifoliate leaves having oval spear-shaped lobes, and flowers growing in heads.* Trifolium bitumen redolens angustifolium ac sempervirens. Boerh. Ind. alt. 2. p. 32. *Trefoil smelling like Bitumen, with a narrow evergreen leaf.*
10. **PSORALEA (Corylifolia)** foliis simplicibus ovatis. Hort. Upsal. 225. *Psoralea with oval simple leaves.* Loto affinis coryli folio. Dodart. Acad. Scien. 4. p. 289. The first sort grows naturally at the Cape of Good Hope, from whence I have frequently received the seeds. This rises with a soft shrubby stalk four or five feet high, dividing into several branches, which are garnished with deep green winged leaves, composed of three or four pair of very narrow linear lobes, terminated by an odd one, standing upon short foot-stalks, which come out without any order on every side the branches. The flowers sit very close to the branches, coming out from the wings of the leaves; they are often in clusters. The standard, which is erect and reflexed at the top, is of a fine blue; the wings are pale, and the keel white; these are succeeded by short pods the length of the empalement, each containing one kidney-shaped seed. It flowers great part of summer, and the seeds ripen in autumn. This is easily propagated by seeds, which should be sown upon a moderate hot-bed; and when the plants come up, they must not be drawn weak, for as they are not tender, so they should have air and but little heat. When they are fit to remove, they should be planted in separate small pots, filled with light earth, and plunged again into the bed, shading them from the sun till they have taken new root; then they should be gradually inured to the open air, into which they should be removed about the end of May, and kept abroad till October; then they must be placed in the green-house, and treated in the same way as other plants from the same country. It may also be propagated by cuttings, which may be planted during any of the summer months, on a bed of light earth, covering them close with either bell or hand-glasses, shading them from the sun, and gently refreshing them with water as the ground dries; when they have taken root, they must be hardened gradually, and then transplanted into small pots, and treated like the seedling plants.

The second sort was discovered by the late Dr. Houstoun at La Vera Cruz; this rises with a shrubby stalk three or four feet high, sending out a few side branches, which are garnished with oval trifoliate leaves which are hairy, standing upon slender foot-stalks. The flowers are collected in spikes at the end of the branches; they are of a purplish colour, and are succeeded by short pods, each containing one kidney-shaped seed. It is propagated by seeds, which must be sown upon a hot-bed, and the plants afterward treated in the same way as plants from hot countries; but as this is an abiding plant, so they must be removed into the stove in autumn, and kept in a moderate warmth in winter; and in summer they must have a large share of free air, but should constantly remain in the stove; the second year they will produce flowers, and sometimes their seeds will ripen in England.

The seeds of the third sort were brought me from Malabar; this is an annual plant, with trailing stalks about eight inches long, garnished with silvery leaves, composed of three or four pair of narrow lobes, terminated by an odd one. The flowers grow in small clusters at the wings of the leaves; they are small, and of a purple colour; the seed-pods are short, and have one small kidney-shaped seed in each. This is propagated by seeds, in the same manner as the second sort.

The fourth sort was discovered by the late Dr. Houstoun at Campeachy, where it grows naturally. This hath slender, shrubby, climbing stalks, which twine about any neighbouring support, and rise to the height of six or seven feet, garnished with winged leaves, composed of three pair of small, oval, obtuse lobes, terminated by an odd one. The flowers come out in small clusters from the wings of the leaves; they are small, of a bright blue colour, and are succeeded by short pods, including one kidney-shaped seed.

The fifth sort was discovered by the same gentleman, growing naturally at Campeachy. This rises with a shrubby stalk seven or eight feet high, sending out many long slender branches on every side, garnished with trifoliate leaves, whose lobes are small and wedge-shaped. The flowers are produced from the wings of the leaves in close small heads, standing upon pretty long foot-stalks; they are blue, and are succeeded by short pods, each containing a single kidney-shaped seed.

These two sorts are propagated by seeds, which must be sown upon a hot-bed; and when the plants come up, they must be treated in the same way as the third sort.

The sixth sort was discovered by the late Dr. Houstoun at La Vera Cruz; this is an annual plant, with a very branching herbaceous stalk, rising a foot and a half high, spreading wide on every side, garnished with winged leaves, composed of five or six pair of narrow wedge-shaped lobes, terminated by an odd one. The flowers are collected in close oblong spikes, terminating the branches; they are small, and of a bright blue colour, and are succeeded by short pods, each containing a single kidney-shaped seed. This is propagated by seeds, and requires the same treatment as the fourth sort.

The seventh sort grows naturally at La Vera Cruz, from whence the late Dr. Houstoun sent the seeds. This hath an upright shrubby stalk, which rises five or six feet high, having a few side branches, which are closely garnished with winged leaves, composed of three or four pair of small, roundish, hairy lobes, terminated by an odd one. The flowers are collected in small heads, coming out from the wings of the leaves, and at the end of the branches; they are yellow and red intermixed, and are succeeded by short pods, containing one kidney-shaped seed. This sort requires the same treatment as the third.

The eighth sort grows naturally in the south of France and Italy; the root of this is perennial, but the stalk is not of long duration, seldom lasting more than two

years; it rises about two feet high, sending out two or three slender branches, garnished with trifoliate leaves, whose lobes are oval, about two inches long, and one inch and a quarter broad, standing upon long foot-stalks; these, if handled, emit a strong scent of bitumen. The flowers are collected in heads, and have foot-stalks seven or eight inches long; they are blue, and are succeeded by short pods containing one seed.

The ninth sort grows naturally in Sicily, and also in Jamaica, from both which countries I have received the seeds. This has been supposed to be the same with the former, but I have many years propagated both by seeds, and have never found either of them vary. The leaves of this are much longer and narrower than those of the former sort, and are rounded at their base; the stalks are shrubby, and are of longer duration; the heads of the flowers are smaller, and the leaves have not so strong an odour. These are propagated by seeds, which should be sown on a bed of light earth in April, and in May the plants will come up, when they should be kept clean from weeds, and as soon as they are fit to remove they should be transplanted. Those of the eighth sort will live thro' the winter in the open air, if they are planted in a warm dry border; but the ninth sort requires some shelter in winter, so these should be planted in pots, and put into a common frame in winter, where they may be screened from hard frost. These plants flower from June to autumn, and perfect their seeds annually.

The tenth sort grows naturally in India; this is an annual plant; the stalks rise two feet high, and are garnished at each joint by one oval leaf about two inches long, and one inch and a half broad, having one strong midrib, from which come out several veins, which run toward the top of the leaf. The flowers stand upon long slender foot-stalks, which come out at the wings of the leaves; they are collected into small round heads, and are of a pale flesh colour. It flowers in July, and the seeds ripen in autumn. This is propagated by seeds, which must be sown upon a hot-bed in the spring; and when the plants are fit to remove, they should be planted into separate small pots filled with light earth, and plunged into a moderate hot-bed of tanners bark, shading them from the sun till they have taken new root, after which they must have free air admitted to them in warm weather, and gently watered as often as they require it. When the plants have filled the pots with their roots, they should be removed into larger, and the beginning of July they may be removed into an airy glass-case, where they may be defended from cold, but should have free air in warm weather; with this care the plants will flower and ripen their seeds.

PSYLLIUM. See PLANTAGO.

PTRAMICA. See ACHILLEA.

PTELEA. Lin. Gen. Plant. 141. Shrub Trefoil.

The CHARACTERS are,

The empalement of the flower is small, and cut into four acute segments. The flower has four oval spear-shaped petals, which spread open flat; it hath four awl-shaped stamina terminated by roundish summits, and an orbicular compressed germen, supporting a short style, crowned by two obtuse stigmas. The germen afterward becomes a roundish membranaceous capsule with two cells, each containing one obtuse seed.

This genus of plants is ranged in the first section of Linnæus's fourth class, which includes those plants whose flowers have four stamina and one style.

The SPECIES are,

1. PTELEA (*Trifoliata*) foliis ternatis. Lin. Sp. Plant. 118. *Ptelea with trifoliate leaves.* Frutex Virginianus trifolius, ulmi samaris. Pluk. Alm. 159. *Virginia Trefoil Shrub, with seeds like Elm, commonly called Carolina Shrub Trefoil.*

2. PTELEA (*Viscosa*) foliis simplicibus. Lin. Sp. Plant. 118. *Ptelea with single leaves.* Carpinus viscosa, salicis folio integro oblongo. Burm. Zeyl. 55. tab. 23. *Viscous Hornbeam with an entire oblong Willow leaf.* Plumier

mier has titled it *Staphyllodendron Americanum foliis lauri angustis*. Cat. 18. *American Bladder Nut, with narrow Bay leaves*.

The first sort grows naturally in North America; it was first discovered in Virginia by Mr. Banister, who sent the seeds to England, from which some plants were raised at Fulham, and some other curious gardens; but being planted in the open air, they were destroyed by a severe winter, so that there were scarce any of the plants left in England. In 1724, Mr. Catesby sent over a good quantity of the seeds from Carolina, which succeeded so well as to furnish many gardens with the plants. This rises with an upright woody stem ten or twelve feet high, dividing upward into many branches, covered with a smooth grayish bark, garnished with trifoliate leaves standing upon long foot-stalks. The lobes are oval, spear-shaped, smooth, and of a bright green on their upper side, but pale on their under; these come out late in the spring, soon after which the bunches of flower-buds appear, which is generally in the beginning of June, the leaves being then but small, and afterward increase in their size, but are not fully grown till the flowers decay. The flowers are produced in large bunches at the end of the branches; they are of an herbaceous white colour, composed of four or five short petals, ending in acute points; these are fastened at their base to a short empalement, cut into four segments almost to the bottom. In the center is situated an orbicular compressed germen supporting a short style, which is attended by four awl-shaped stamina; the germen afterward turns to a capsule surrounded by a leafy border, having two cells, each containing one seed.

These shrubs may be propagated by cuttings, which should be planted in pots of fresh rich earth, and plunged into a moderate hot-bed. The best time for planting them is in the beginning of March, but they must be carefully managed so as not to have too much heat, and shaded from the sun in the middle of the day, otherwise they will not succeed. They may also be propagated by layers, but these are often two years before they take root; but if good seeds can be procured either here or from abroad, the plants raised from those will be much stronger than those which are propagated by either of the former methods.

These seeds may be sown in the beginning of April, on a bed of light earth, in a warm sheltered situation, where, if the ground is moistened in dry weather, the plants will come up in six weeks; but if the seeds are sown in pots, and placed on a very moderate hot-bed, the plants will come up sooner, and make greater progress the first year; but they must not be forced or drawn, for that will make them very tender; therefore in June the plants should be exposed to the open air, in a sheltered situation, where they may remain till the frost comes on, when those in the pots should be either placed under a common frame, to shelter them from severe frost, or the pots plunged into the ground, near a hedge, that the frost may be prevented from penetrating through the sides of the pots to the roots of the plants. The following spring the plants may be planted into a nursery-bed, at about one foot distance, where they may grow two years, by which time they will be fit to transplant where they are designed to remain.

These plants are a little tender while they are young, therefore will require some protection the first and second year, but particularly from the early frosts in autumn, which frequently kills the tops of the tender shoots before they are hardened; and the more vigorous the plants have grown the preceding summer, the greater danger there is of their being killed, therefore they should be screened either with mats or some other covering; but as they advance in strength, they become more hardy, and are rarely injured by frost.

The second sort grows naturally in both Indies; it is very common in most of the islands in the West-In-

dies. This sends up several stalks from the root, about the size of a man's arm, sending out several upright branches, covered with a light brown bark, which frequently separates from the wood, and hangs loose; they are garnished with stiff leaves, which vary greatly in their shape and size, some being four inches long, and an inch and a half broad; others are not three inches long, and a quarter of an inch broad; they are spear-shaped, entire, and of a light green, growing with their points upward, and have very short foot-stalks. The flowers are produced at the end of the branches in a sort of racemus, each standing upon a slender foot-stalk about an inch long; they have four solid channelled petals of an herbaceous colour, having four stamina which spread open, and in the center is situated a roundish compressed germen, which afterward turns to a compressed capsule with three cells, surrounded by a broad leafy border, each cell containing one or two roundish seeds.

This plant is propagated by seeds, which, if obtained fresh from abroad, will rise easily upon a hot-bed: when the plants are fit to remove, they should be each planted in a separate small pot filled with light loamy earth, and plunged into a hot-bed of tanners bark, shading them from the sun till they have taken new root; then they should have free air admitted to them every day in proportion to the warmth of the season, for they must not be drawn up weak, nor should they have too much water. In the autumn the plants must be removed into the stove, where they should have a temperate warmth in winter, but during that season little water should be given them; nor should they have too much heat, for either of these will soon destroy them: as the plants obtain strength, they will become more hardy, and may be set abroad in the open air for two or three months in the heat of summer, but it should be in a sheltered situation; in winter they must be placed in a stove, kept to a moderate temperature of warmth, for the plants will not live in a green-house here.

This was formerly shewn for the Tea-tree in many of the European gardens, where it many years passed for it among those who knew no better.

PULEGIUM. Raii Meth. Plant. 61. *Mentha*. Tourn. Inst. R. H. 189. Lin. Gen. Plant. 633. [This plant takes its name from *Pulex*, a flea; because being burnt, it is said to drive away fleas.] Pennyroyal, or Pudden-grass.

The CHARACTERS are,

The empalement of the flower is permanent, of one leaf, cut into five parts. The flower is of the lip kind; it hath one petal with a short tube, divided at the brim into four parts; the helmet, or upper lip of the flower, is entire, the lower is cut into three equal segments. It hath four stamina, two being longer than the other, terminated by roundish summits, and a four-pointed germen, supporting an erect style, crowned by a bifid stigma. The germen afterward become four small seeds, sitting in the empalement of the flower.

This genus of plants is ranged in the second section of Mr. Ray's fourteenth class, which includes the herbs with whorled flowers which have scarce any helmet, but are cut into equal segments. Tournefort and Linnæus place this under the genus of *Mentha*, to which it may properly be joined; but as this is a title which has been long known in the shops and gardens, so I have chose to continue it.

The SPECIES are,

1. **PULEGIUM** (*Vulgare*) foliis ovatis obtusis, staminibus corollam æquantibus, caule repente. Pennyroyal with oval obtuse leaves, stamina equalling the petal, and a creeping stalk. *Pulegium latifolium*. C. B. P. Common or broad-leaved Pennyroyal.
2. **PULEGIUM** (*Erectum*) foliis lanceolatis, staminibus corollâ longioribus, caule erecto. Pennyroyal with spear-shaped leaves, stamina longer than the petal, and an upright stalk. *Pulegium Hispanicum erectum*, staminibus florum extantibus. Aët. Phil. London. Upright Spanish Pennyroyal, whose stamina stand out from the flowers.

3. PULEGIUM (*Cervinum*) foliis linearibus, floribus verticillatis terminalibusque. Pennyroyal with linear leaves, and flowers growing in whorls at the ends of the stalks. Pulegium angustifolium. C. B. P. Narrow-leaved Pennyroyal.

The first sort grows naturally upon moist commons, where the water stands in winter, in many parts of England. The root is fibrous and perennial; the stalks are smooth and trail upon the ground, putting out roots at every joint, whereby it spreads and propagates very fast; the stalks are garnished at each joint by two oval leaves, which are for the most part entire. The flowers grow toward the upper part of the branches, coming out just above the leaves at each joint, in whorls; they are of a pale purple colour, small and galeated, the helmet being entire; whereas in the Mint, this is indented at the point. The stamina of the flowers are of the same length with the petal, but the style is somewhat longer; the whole plant has a very strong smell, and a hot aromatic taste. There is a distilled water of this plant and also an oil, which is kept in the shops for medicinal use. There is a variety of this with a white flower, which is sometimes found growing naturally in England.

The seeds of the second sort were sent me from Gibraltar, which succeeded in the Chelsea Garden, but had been before introduced into several gardens, where it had been cultivated to supply the markets. The stalks of this grow erect and near a foot high; the leaves are longer and narrower than those of the common sort, the whorls of flowers are much larger, and their stamina are longer than the petals. This sort hath almost superseded the first in the markets, for as the stalks grow erect, so it is much easier to cut and tie in bunches than the common sort; it also comes earlier to flower, and has a brighter appearance, but whether it is as good for use, I shall leave to be determined by those whose province it belongs to.

The third sort grows naturally in the south of France and Italy; it is called Hart's Pennyroyal. This is by some preferred to the common sort for medicinal use; the stalks of this grow erect, near two feet high, sending out side branches all their length; the leaves are very narrow, and of a thicker substance than those of the common sort, the whorls of flowers are rather larger; the scent is not quite so strong as that of the first sort, and the stalks are frequently terminated by whorls of flowers. This is cultivated in gardens here, and flowers about the same time as the common sort. There is a variety of this with white flowers, which grows taller than that with purple flowers, but I do not believe it is a different sort. All these plants propagate themselves very fast by their branches trailing upon the ground, which emit roots at every joint, and fasten themselves into the earth, and send forth new branches; so that no more is required in their culture, than to cut off any of these rooted branches, and plant them out in fresh beds, allowing them at least a foot from plant to plant every way, that they may have room to grow; or the young shoots of these planted in the spring, will take root like Mint.

The best time for this work is in September, that the plants may be rooted before winter; for if the old roots are permitted to remain so close together, as they generally grow in the compass of a year, they are subject to rot in winter; besides the young plants will be much stronger, and produce a larger crop the succeeding summer, than if they were removed in the spring. These plants all love a moist strong soil, in which they will flourish exceedingly.

PULMONARIA. Tourn. Inst. R. H. 136. tab. 55. Lin. Gen. Plant. 184. [so called from Pulmones, Lat. the lungs, because supposed to be a very good medicament for the lungs.] Lungwort; in French, Pulmonaire.

The CHARACTERS are,

The flower hath a cylindrical, five-cornered, permanent

empalement of one leaf, cut into five segments at the top. The flower is of one petal, having a cylindrical tube the length of the empalement, cut at the top into five parts, which spread open, but the chaps are pervious. It hath five short stamina, terminated by erect summits which close together, and four germen supporting a short style, crowned by an obtuse indented stigma. The germen afterward turn to four roundish seeds, sitting in the bottom of the empalement.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one style.

The SPECIES are,

1. PULMONARIA (*Officinalis*) foliis radicalibus ovato-cordatis scabris. Hort. Cliff. 44. Lungwort whose lower leaves are oval, heart-shaped, and rough. Pulmonaria vulgaris, maculoso folio. Clus. Hist. 169. Common spotted Lungwort, or Jerusalem Cowslip.
2. PULMONARIA (*Alpina*) foliis caulinis ovatis glabris, floribus patulis, segmentis obtusiusculis. Lungwort with oval smooth leaves to the stalks, spreading flowers, and obtuse segments. Pulmonaria Alpina, foliis molli-bus subrotundis, flore cæruleo. Tourn. Inst. R. H. 136. Lungwort of the Alps, with soft roundish leaves, and a blue flower.
3. PULMONARIA (*Saccharata*) foliis lanceolatis basi semi-amplexicaulibus, calycibus abbreviatis. Lungwort with spear-shaped leaves, whose base half embrace the stalk, and the empalement shorter than the tube of the flower. Pulmonaria maxima foliis quasi saccharo incrustatis. Pluk. Alm. 359. Greatest Lungwort with spotted leaves, as if they were incrustated with sugar.
4. PULMONARIA (*Angustifolia*) foliis radicalibus lanceolatis. Hort. Cliff. 44. Lungwort with the lower leaves spear-shaped. Pulmonaria angustifolia cæruleo flore. J. B. 3. 596. Narrow-leaved Lungwort with a blue flower.
5. PULMONARIA (*Orientalis*) caulibus procumbentibus, floribus singularibus alaribus, calycibus inflatis corollâ longioribus. Lungwort with trailing stalks, flowers growing singly from the sides, and swollen empalements which are longer than the petals. Pulmonaria Orientalis, calyce vesicario, foliis echii, flore purpureo infundibuliformi. Tourn. Cor. 6. Eastern Lungwort with an empalement like a bladder, a Viper's Bugloss leaf, and a purple funnel-shaped flower.
6. PULMONARIA (*Virginica*) calycibus abbreviatis, foliis lanceolatis obtusiusculis. Lin. Sp. Plant. 135. Lungwort with short empalements to the flowers, and spear-shaped obtuse leaves. Symphytum five pulmonaria non maculata, foliis glabris acuminatis flore patulo cæruleo. Pluk. Alm. 359. Lungwort with smooth, unspotted, acute-pointed leaves, and a blue spreading flower.

The first sort grows naturally in woods and shady places in Italy and Germany, and is cultivated in the English gardens chiefly for medicinal use. It hath a perennial fibrous root; the lower leaves are rough, of an oval heart-shape, about six inches long, and two inches and a half broad, of a dark green on their upper side, marked with many broad whitish spots, but pale and unspotted on their under side; the stalks rise almost a foot high, having several smaller leaves on them, standing alternately. The flowers are produced in small bunches at the top of the stalks, each having a tubulous hairy empalement as long as the tube of the flower; the brims of the petal are spread open, and are shaped like a cup; these are red, purple, and blue, in the same bunch. They appear in April, and are succeeded by four naked seeds, which ripen in the empalement. It is accounted a pectoral balsamic plant, and good for coughs and consumptions, spitting of blood, and the like disorders of the lungs; it is likewise put into wound drinks.

The second sort grows naturally on the Alps; this hath a perennial fibrous root; the leaves are large, smooth, and spotted on their upper side; the stalks rise nine inches high, and are garnished with oval leaves whose base join the stalks. The flowers grow in small bunches on the top of the stalk; they are purple, and spread open wider than those of the common sort.

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The third sort grows naturally upon the Helvetian Mountains; this is a perennial plant, whose leaves are large, spear-shaped, and rough. The foot-stalks of the lower leaves are broad; the stalks rise a foot high, and are garnished with spear-shaped leaves, whose base half embrace the stalks; the leaves are greatly spotted with white, appearing as if they were incrustated with sugar-candy; the flowers grow in large bunches on the top of the stalk; their tubes are longer than the empalement, and their brims are spread more than those of the common sort. They are of a bright blue, and appear in April and May. The fourth sort grows naturally in Austria and Hungary; this hath leaves much narrower than those of the common sort, which are covered with soft hairs. The stalks rise a foot high, and are garnished with narrow leaves of the same shape with those below, but smaller; these almost embrace the stalk with their base. The flowers are produced in bunches on the top of the stalks like the others; these appear of a red colour before they expand, but when they are fully blown, are of a most beautiful blue colour. This sort flowers early in the spring, but is very rare in England at present.

The fifth sort was discovered in the Archipelago by Dr. Tournefort, who sent the seeds to the Royal Garden at Paris; this is an annual plant. The lower leaves are oblong and hairy; the stalks trail upon the ground, and are a foot and a half long, garnished with oblong hairy leaves sitting close to the stalks; just above each leaf comes a single flower of a full purple colour, funnel-shaped, the brims not spreading; the empalement is swollen like an inflated bladder, and covers the petal of the flower, so as not to be seen without a near inspection. This plant flowers in May, if the plants come up in autumn, and after the flowers are past, the four seeds ripen in the empalement.

The sixth sort grows naturally upon mountains in most parts of North America. The seeds of this plant were sent many years since by Mr. Banister from Virginia, and some of the plants were raised in the gardens of the Bishop of London, at Fulham, where for several years it was growing, and was communicated to several other curious gardens; this hath a thick, fleshy, perennial root, sending out many small fibres. The stalks rise a foot and a half high, and divide at the top into several short branches; the leaves which are near the root are four or five inches long, and two inches and a half broad; they are smooth, obtuse, and of a light green, having short foot-stalks; those upon the stalk diminish in their size upward, but are of the same shape, and sit close to the stalk. Each of the small branches at the top of the stalk is terminated by a cluster of flowers, each standing upon a separate short foot-stalk; their empalements are very short, and are cut into five segments almost to the bottom; the tube of the flower is long, and at the top spreads open in shape of a funnel, the brim being entire, but appears five-cornered from the folding of the petal. The most common colour of these flowers is blue, but there are some purple, others red, and some white. They appear in April, and, if they have a shady situation, will continue in beauty great part of May, and sometimes they are succeeded by seeds in England. The leaves and stalks entirely decay in August, and the roots remain naked till the following spring.

There are some other species of this genus, which are preserved in botanic gardens for the sake of variety, but, having little beauty, they are seldom cultivated in other places.

The first, second, third, fifth, and sixth sorts have perennial roots, so may be cultivated by parting of their roots, which may be done either in the spring, or autumn; but if the ground be moist into which they are planted, it is better to be done in the spring, otherwise the autumn is the more preferable season, that the plants may be well rooted before the dry wea-

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ther comes on in the spring, which will cause them to flower much stronger.

The soil in which they are planted should not be rich, but rather a fresh light sandy ground, in which they will thrive much better than in a richer soil, in which they are very subject to rot in the winter. They should have a shady situation, and the first and third sorts thrive best in a moist soil, for in a hot dry soil they burn and decay in summer, unless they are duly watered in dry weather. All these early sorts are better transplanted, and parted in autumn, that they may be well rooted to flower strong the following spring. The sixth sort should not have a soil too moist, for as the roots run deep in the ground, they will be in danger of rotting by much wet.

The other sort is annual, and propagated by seeds only. The best time to sow these is in autumn, soon after they are ripe, for the plants will resist the cold of our winters very well, so will flower early the following summer, and good seeds may be obtained; whereas those which are sown in the spring sometimes miscarry, or lie a year in the ground. These seeds should be sown where they are designed to remain, for the plants do not succeed very well when they are transplanted. When the plants come up, they require no other culture but to keep them clear from weeds; and, where they are too close, to thin them. If these plants are permitted to scatter their seeds, the plants will come up better than when they are sown.

PULSATILLA. Tourn. Inst. R. H. 284. tab. 148. Anemone. Lin. Gen. Plant. 614. [so called of Pulsando, Lat. because the seeds of this plant are blown, and fly away with the least wind.] Pasque-flower; in French, *Coquelourde*.

The CHARACTERS are,

The flower hath a leafy involucre ending in many points; it hath two orders of petals, three in each which are oblong and pointed, and a great number of slender stamina about half the length of the petals, terminated by erect twin summits, and a great number of germen collected in a head, with acute styles crowned by obtuse stigmas. The germen afterward become so many seeds, having long hairy tails sitting upon the oblong receptacle.

This genus of plants is ranged in the seventh section of Linnæus's thirteenth class, which includes those plants whose flowers have many stamina and styles, and joins this genus to the Anemone in the later editions of his works.

The SPECIES are,

1. **PULSATILLA** (*Vulgaris*) foliis decompositis pinnatis, flore nutante, limbo erecto. Hort. Cliff. 223. *Pasque-flower with decomposed winged leaves, and a nodding flower having an erect rim.* Pulsatilla folio crassiore & majore flore. C. B. P. 177. *Pasque-flower with a thicker leaf, and a larger flower.*
2. **PULSATILLA** (*Pratenfis*) foliis decompositis pinnatis, flore pendulo, limbo reflexo. Hort. Cliff. 223. *Pasque-flower with decomposed winged leaves, and a pendulous flower whose border is reflexed.* Pulsatilla flore minore nigricante. C. B. P. 177. *Pasque-flower with a smaller darkish flower.*
3. **PULSATILLA** (*Vernalis*) foliis simpliciter pinnatis, foliolis lobatis, flore erecto. Flor. Suec. 448. *Pasque-flower with simple winged leaves, whose wings have lobes and an erect flower.* Pulsatilla lutea apii hortensis folio. C. B. P. 177. *Yellow Pasque-flower with a Parsley leaf.*
4. **PULSATILLA** (*Patens*) foliis digitatis multifidis, flore erecto patente. *Pasque-flower with hand-shaped leaves having many points, and an erect spreading flower.* Pulsatilla anemones folio dissecto lanuginosa, flore majore dilute luteo patente. Amman. Ruth. 104. *Pasque-flower with a cut Anemone leaf which is downy, and a larger pale, yellow spreading flower.*

The first of these plants is common in divers parts of England; it grows in great plenty on Gogmagog-hills on the left-hand of the highway leading from Cambridge to Haveril, just on the top of the hill; also about

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about Hilderham, six miles from Cambridge, and on Bernack Heath not far from Stamford, and on Southrop Common adjoining thereto; also on mountainous and dry pastures just by Leadstone Hall near Pontefract in Yorkshire. It flowers in April.

This hath a fleshy taper root which runs deep in the ground; the leaves are hairy, and finely cut, like those of the wild Carrot, and spread near the ground; the stalk rises near a foot high, is pretty thick and hairy, and naked at the top, where there is a leafy involucre to the flower, which is hairy, ending in many points; it is terminated by one flower composed of six petals ranged in two orders, three without, and three within; they are oblong, thick, and of a bright purple colour; they form a sort of bell-shaped flower nodding on one side, and their points turn upward. Within the petals are a great number of slender yellowish stamina terminated by erect summits, and in the center a great number of germen are collected in a head, which afterward become seeds, each having a long tail, by which they are distinguished from *Anemone*.

There is a variety of this with double, and another with white flowers, but these have been obtained from seeds of the other.

The second sort hath shorter leaves than the first; the stalks do not rise so high; the flowers do not expand so wide, and hang downward, but their brims are reflexed; they are of a very dark purple colour. This grows naturally in the meadows in Germany.

The third sort grows naturally on the Alps and Helvetian Mountains; this hath a perennial root. The leaves are like those of *Smallage*, and are simply winged; the stalk rises near a foot high, is naked almost to the top, where comes out a neat hairy involucre, and above that one yellow flower shaped like the perennial yellow *Adonis*, standing erect. These appear about the same time with the former, and are succeeded by seeds which ripen at Midsummer.

The fourth sort grows in Siberia; this hath a thick fleshy root which sends out many strong fibres. The leaves are hand-shaped, composed of several roundish lobes, like some of the sorts of *Ranunculi*; they are downy, and cut into several segments. The stalk rises nine or ten inches high, having a hairy involucre a considerable distance below the flower; it is terminated by one flower, which is large, spreading, and of a whitish yellow colour, with deep yellow stamina. This flowers early in the spring.

There are some other species of this plant, but those here mentioned are all the sorts which I have seen growing in England, and therefore I have not enumerated more, as it would be to little purpose, since it is difficult to procure them from the countries where they naturally grow.

These plants may be propagated by seeds, which should be sown in boxes or pots filled with very light sandy earth, observing not to cover the seeds too deep with mould, which will prevent their rising, for they require no more than just to be covered. These boxes should be placed where they may have the morning sun until ten of the clock, but must be screened from it in the heat of the day; and, if the season proves dry, the earth should be often refreshed with water. The best time for sowing of these seeds is in July or August, soon after they are ripe, for if they are kept till spring, they seldom grow.

These boxes or pots, in which the seeds are sown, should remain in this shady situation until the beginning of October, when they should be moved where they may enjoy the full sun during the winter season. About the beginning of March the plants will begin to appear, at which time the boxes should be again removed where they may have only the forenoon sun; for if they are too much exposed to the heat, the young plants will soon be destroyed. They should also be refreshed with water in dry weather, which will greatly promote their growth, and should be carefully kept clean from weeds, which, if suf-

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fered to grow among them, will in a short time overbear them.

When the leaves of this plant are entirely decayed (which is commonly in July,) you should then take up all the roots, which being nearly of the colour of the ground, will be difficult to find while small; therefore you should pass the earth through a fine wire sieve, which is the best method to separate the roots from the earth, (but notwithstanding all possible care taken, yet there will be many small roots left; so that the earth should either be put into the boxes again, or spread upon a bed of light earth, to see what plants will arise out of it the succeeding year.) The roots being taken up, should be immediately planted again on beds of light, fresh, sandy earth, about three or four inches asunder, covering them about three inches thick with the same light earth. The spring following most of these plants will produce flowers, but they will not be so large and fair as in the succeeding years, when the roots are larger.

The roots of these plants generally run down deep in the ground, and are of a fleshy substance, somewhat like Carrots, so will not bear to be kept long out of the ground; therefore, when they are removed, it should be done early in the autumn, that they may take fresh root before the frost comes on; for if they are transplanted in the spring, they will not produce strong flowers. These plants thrive best in a loamy soil, for in very light dry ground they are apt to decay in summer.

PUMPKION. See PEPO.

PUNICA. Tourn. Inst. R. H. 633. tab. 407. Lin. Gen. Plant. 544. [This plant takes its name from its punicean or red appearance, for its flowers and fruit are of that colour. It is called *Granatum*, from the word *Granis*, because the fruit has many grains; or, as some suppose, of *Granata*, or *Granada*, because it grows in great plenty in that country.] The Pomegranate-tree; in French, *Grenadier*.

The CHARACTERS are,

The empalement of the flower is permanent, bell-shaped, coloured, and of one leaf, cut into six parts at the top. The flower has five roundish, erect, spreading petals which are inserted in the empalement, and a great number of slender stamina, which are also inserted in the empalement, terminated by oblong summits. The germen is situated under the flower, supporting a single style crowned by a headed stigma; it afterward becomes a large almost globular fruit, crowned by the empalement. The fruit is divided into several cells by membranous partitions, which are filled with roundish succulent seeds.

This genus of plants is ranged in the first section of Linnæus's twelfth class, in which he places those plants whose flowers have more than twenty stamina, which are inserted either in the petals or empalement, and one style.

The SPECIES are,

1. *PUNICA (Granatum) foliis lanceolatis, caule arboreo.* Hort. Cliff. 134. *Pomegranate with linear spear-shaped leaves, and a tree-like stalk.* *Punica quæ malum granatum fert.* Cæsalp. *Punica which bears the Pomegranate*

2. *PUNICA (Nana) foliis linearibus, caule fruticoso.* *Pomegranate with linear leaves, and a shrubby stalk.* *Punica Americana, nana seu humillima.* Lig. Tourn. Inst. 636. *The American Dwarf Pomegranate.*

There are the following varieties of the first sort, which are supposed to be accidental variations obtained by culture from the seeds, therefore I have not enumerated them as species; but as many curious persons will expect to find them inserted here, I shall just mention them.

The wild Pomegranate with single and double flowers. The sweet Pomegranate.

The small flowering Pomegranate with single and double flowers.

The Pomegranate with striped flowers.

These plants grow naturally in Spain, Portugal, Italy, and Mauritania. There are also many of the in

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in the West-Indies, but they are supposed to have been transplanted there from Europe; but they are so much improved there, as to be much preferable to any in Europe, the fruit being larger and finer flavoured.

This tree rises with a woody stem eighteen or twenty feet high, sending out branches the whole length, which likewise put out many slender twigs, so as to render them very thick and bushy. Some of these are armed with sharp thorns; they are garnished with spear-shaped leaves about three inches long, and half an inch broad in the middle, drawing to a point at each end; they are of a light lucid green, and stand opposite. The flowers come out at the end of the branches, sometimes singly, and at others three or four together; one of the largest terminates the branch, and immediately under that are two or three smaller buds, which, after the flower is past, swell larger and expand, whereby there is a continued succession of flowers for some months. The empalement of the flower is very thick, fleshy, and of one piece, cut at the top into five segments; it is of a fine red colour, and within are included five in the single flowers, but in the double a great number of scarlet petals, which are inserted in the empalement. In the center is situated the style, arising from the germen, encompassed by many slender stamina, which are terminated by oblong yellowish summits. After the flower decays, the germen swells to a roundish fruit crowned by the empalement, having a hard shell, including a pulp filled with angular seeds. This tree flowers in July, August, and September, and the fruit ripens late in autumn.

The Balautia of the shops is the empalement of the flower of the double flowering Pomegranate.

The first of these trees is now pretty common in the English gardens, where formerly it was nursed up in cases, and preserved in green-houses with great care (as was also the double flowering kind;) but they are both hardy enough to resist the severest cold of our climate in the open air; and, if planted against warm walls in a good situation, the first sort will often produce fruit, which in warm seasons will ripen tolerably well; but as these fruits do not ripen till late in the autumn, they are seldom well tasted in England, for which reason the sort with double flowers is commonly preferred to it. The sort with sweet fruit, as also the wild sort, are less common in the English gardens than the former two.

These plants may be easily propagated by laying down their branches in the spring, which in one year's time will take good root, and may then be transplanted where they are designed to remain. The best season for transplanting of these trees is in spring, just before they begin to shoot; they should have a strong rich soil, in which they flower much better, and produce more fruit than if planted on dry poor ground; but in order to obtain these in plenty, there should be care taken in the pruning of these trees, for want of which we often see these trees very full of small shoots, but do not find many flowers produced upon them; therefore I shall set down directions for pruning of these trees, so as to obtain a great quantity of flowers and fruit.

The flowers of this tree, always proceed from the extremity of the branches which are produced the same year. This therefore directs, that all weak branches of the former year should be cut out, and that the stronger should be shortened in proportion to their strength, in order to obtain new shoots in every part of the tree. The branches may be laid in against the wall about four or five inches asunder; for, as their leaves are small, there is not a necessity of allowing them a greater distance. The best time for this work is about Michaelmas, or a little later, according to the mildness of the season, for if they are left until spring before they are pruned, they seldom put out their shoots so early, and the earlier they come cut, the sooner the flowers will appear, which is of great consequence where fruit is desired. In summer

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they will require no other dressing, but to cut off all vigorous shoots which grow from the wall, and never produce flowers (for it is the middling shoots only which are fruitful;) and when the fruit is formed, the branches on which they grow should be fastened to the wall to support them; otherwise the weight of the fruit, when grown large, will be apt to break them down.

Though, as I said before, the fruit of this tree seldom arrives to any perfection in this country, so as to render it valuable; yet, for the beauty of its scarlet-coloured flowers, together with the variety of its fruit, there should be one tree planted in every good garden, since the culture is not great which they require; the chief care is to plant them upon a rich strong soil, and in a warm situation. Upon some trees which had these advantages, I have obtained a great quantity of fruit which have arrived to their full magnitude, but I cannot say they were well flavoured; however, they made a very handsome appearance upon the trees.

The double flowering kind is much more esteemed than the other in this country for the sake of its large, fine, double flowers, which are of a most beautiful scarlet colour; and, if the trees are supplied with nourishment, will continue to produce flowers for two months successively, which renders it one of the most valuable flowering trees yet known. This must be pruned and managed in the same manner as hath been already directed for the fruit-bearing kind, but this sort may be rendered more productive of its beautiful flowers by grafting it upon stocks of the single kind, which will check the luxuriancy of the trees, and cause them to produce flowers upon almost every shoot; by which method I have had a low tree, which was planted in the open air, extremely full of flowers, which made a very fine appearance.

The second sort grows naturally in the West-Indies, where the inhabitants plant it in their gardens to form hedges. It seldom rises more than five or six feet high in those countries, so may be kept within compass, and there the plants continue flowering great part of the year. The flowers of this kind are much smaller than those of the common sort; the leaves are shorter and narrower, and the fruit is not larger than a Nutmeg, and has little flavour, so it is chiefly propagated for the beauty of its flowers. This is undoubtedly a distinct species from the common sort, and is much tenderer.

This plant may be propagated by layers in the same manner as the former sorts, but must be planted in pots filled with rich earth, and preserved in a green-house, otherwise it is too tender to endure the cold of our winters; and in the summer, when the flowers begin to appear, if the plants are exposed to the open air, the buds will fall off, and never open; so that they should not be exposed to the open air, but placed in an airy glass-case, giving them a large share of air every day in mild weather. As they will be covered at the top by the glasses, the flowers will expand, and the fruit will grow to the full size in England with this management, though they are not very desirable; but hereby the plants may be continued in flower upward of two months, and will make a fine appearance.

PURSLAIN. See PORTULACA.

PYRACANTHA. See MESPILUS.

PYROLA. Tourn. Inst. R. H. 256. tab. 132. Lin. Gen. Plant. 490. Winter-green.

The CHARACTERS are,

The flower hath a small permanent empalement cut into five segments; it hath five roundish, concave, spreading petals, and ten awl-shaped stamina terminated by large nodding summits with two rising horns, and a roundish germen supporting a slender style, which is permanent and longer than the stamina, crowned by a thick stigma. The germen afterward becomes a roundish, depressed, five-cornered capsule, with five cells opening at the angles, filled with seeds.

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This genus of plants is ranged in the first section of Linnæus's tenth class, which contains those plants whose flowers have ten stamina and one style.

The SPECIES are,

1. PYROLA (*Rotundifolia*) staminibus adscendentibus, pistillo declinato. Flor. Suec. 330. *Winter-green with rising stamina, and a declining pointal.* Pyrola rotundifolia major. C. B. P. 191. *Greater round-leaved Winter-green.*
2. PYROLA (*Secunda*) racemo unilaterali. Flor. Suec. 332. *Winter-green with a bunch of flowers ranged on one side the foot-stalk.* Pyrola folio mucronato ferrato. C. B. P. 191. *Winter-green with a sawed pointed leaf.*
3. PYROLA (*Uniflora*) scapo unifloro. Flor. Lapp. 167. *Winter-green with one flower in a sheath.* Pyrola rotundifolia minor. C. B. P. 191. *Smaller round-leaved Winter-green.*
4. PYROLA (*Maculata*) pedunculis bifloris. Lin. Sp. Plant. 396. *Winter-green with two flowers on a foot-stalk.* Pyrola Marylandica minor, folio mucronato arbuti. Pet. Mus. 675. *Smaller Winter-green of Maryland, with a pointed Strawberry leaf.*

The first sort grows wild in many places in the North of England, particularly near Halifax in Yorkshire, on rocky hills and heaths, as also in shady woods; so it is very difficult to preserve in gardens in the southern parts.

This hath a perennial root, from which spring out five or six roundish leaves, about an inch and a half long, and almost as broad, of a thick consistence, of a deep lucid green, and entire, standing upon pretty long foot-stalks. Between these rise a slender upright stalk near a foot high, naked great part of the length, ending in a loose spike of flowers, which are composed of five large concave petals, spreading like a Rose, but the two upper leaves are formed into a kind of helmet. In the center is situated a crooked pointal, bending downward, attended by ten slender stamina, terminated by Saffron-coloured summits. It flowers in July, and the flowers are succeeded by cornered compressed capsules, having five cells, filled with small seeds.

The second sort grows naturally upon mountains in Italy, particularly near Verona and Genoa, and I have found it growing in Westmoreland. This hath a slender, creeping, perennial root, from which arise two or three very slender ligneous stalks about five inches high, sustaining at the top four or five oval acute-pointed leaves, an inch and a half long, and one broad, of a thinner consistence, and a brighter green than those of the former, each standing upon a short foot-stalk; and between these, on the side of the stalk, comes out the foot-stalk of the flowers, upon which they are ranged along one side; they are shaped like the other, but are smaller, as are also the capsules. It flowers about the same time with the first sort.

The third sort grows naturally in shady woods in the northern parts of Europe. This hath a perennial creeping root, from which come forth four or five roundish leaves of a pretty thick consistence, and between these arises a foot-stalk about four inches high, sustaining one large white flower on the top, of the same shape as the others. It flowers in June.

The fourth sort grows naturally in North America; this hath a ligneous perennial root, from which arise two or three ligneous stalks a foot and a half high, garnished with stiff leaves two or three inches long, one broad near the base, ending in acute points, and have some sharp indentures on their borders; the midrib is remarkably broad, and very white, as are also the veins which run from it. The flowers are produced at the end of the stalk on slender foot-stalks about three inches long, each sustaining two small pale-coloured flowers at the top. It flowers in June. These are all of them very difficult to cultivate in gardens, for as they grow on very cold hills, and in mossy moorish soil, when they are removed to a better soil, and in a warmer situation, they seldom continue long. The best time to transplant these plants into gardens is about Michaelmas, provided the roots can then be found, when they should be taken up with balls of

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earth to their roots, and planted in a shady situation, and on a moist undunged soil, where they should be frequently watered in dry weather, otherwise they will not thrive. Some of these plants may be planted in pots, which should be filled with earth as nearly resembling that in which they naturally grow as possible, and place them in a shady situation, where, if they are constantly watered in dry weather, they will thrive very well.

The first sort is ordered by the College of Physicians to be used in medicine, and is generally brought over from Switzerland amongst other vulnerary plants, amongst which class this plant is ranged, and by some hath been greatly commended.

PYRUS. Tourn. Inst. R. H. 628. tab. 404. Lin. Gen. Plant. 550. The Pear-tree; in French, *Poirier*.

The CHARACTERS are,

The flower hath a permanent empalement of one leaf, which is concave, and divided into five parts at the top; it hath five roundish concave petals, which are inserted in the empalement, and many awl-shaped stamina shorter than the petals, which are also inserted in the empalement, and terminated by single summits. The germen is situated under the flower, supporting four or five styles crowned by single stigmas; it afterward becomes a pyramidal fleshy fruit indented at the top, but produced at the base, having five membranaceous cells, each containing one smooth oblong seed pointed at the base.

This genus of plants is ranged in the fourth section of Linnæus's twelfth class, which includes those plants whose flowers have more than twenty stamina inserted in the empalement, and five styles. To this genus he has joined the Malus and Cydonia.

The Pear and Quince may be joined together with more propriety than the Apple with either, for the fruit of the the two former are produced at their base, whereas the Apple is indented both at the top and bottom; nor will the Apple grow upon either of the other two, or they upon the Apple, when grafted or budded; but the Quince and Pear will grow upon each other, so there is a boundary set by nature between those and the Apple. The several varieties of Pears, which are now cultivated in the curious fruit-gardens, have been accidentally obtained by seeds, so must not be deemed distinct species; but, as they are generally distinguished in the fruit-gardens and nursery, by the shape, size, and flavour of their fruit, I shall continue those distinctions, that the work may not appear imperfect to such as delight in the cultivation of these fruits.

The SPECIES are,

1. PYRUS (*Musk*) sativa, fructu æstivo parvo racemoso odoratissimo. Tourn. *Petit Muscat, i. e. Little Musk Pear, commonly called the Supreme.* This fruit is generally produced in large clusters; it is rather round than long, the stalk short; and, when ripe, the skin is of a yellow colour; the juice is somewhat musky, and, if gathered before it is too ripe, is a good Pear. This ripens the middle of July, and will continue good but for a few days.
2. PYRUS (*Chio*) sativa, fructu æstivo minimo odoratissimo. Tourn. *Poire de Chio, i. e. the Chio Pear, commonly called the little Bastard Musk Pear.* This is smaller than the former, but is in shape pretty much like that. The skin, when ripe, has a few streaks of red on the side next the sun, and the fruit seldom hangs in clusters as the former, but in other respects is nearly like it.
3. PYRUS (*Citron des Carmes*) sativa, fructu æstivo parvo, è viridi albedo. Tourn. *Poire Hâtiveau, i. e. the Hasting Pear; Poire Madeleine, ou Citron des Carmes, called commonly the green Chisel.* This is a larger Pear than either of the former, and is produced more toward the pedicle. The skin is thin, and of a whitish green colour when ripe; the flesh is melting, and, if not too ripe, of a sugary flavour, but is apt to be mealy. This ripens in the end of July.
4. PYRUS (*Muscadelle*) sativa, fructu æstivo partim saturatè rubente, partim flavescente. Tourn. *Muscadelles Rouges, i. e. the red Muscadelle.* It is also called *La Bellissime, i. e. the Fairest or Supreme.* This is a large early Pear, of great beauty; the skin is of a fine

10 Z

yellow

yellow colour, when ripe, beautifully striped with red; the flesh is half melting, and has a rich flavour, if gathered before it be too ripe, but it is apt to be meally. This generally produces two crops of fruit in a year; the first is commonly ripe about the end of July, and the second ripens in September, but this late crop is seldom well tasted.

5. PYRUS (*Muscat*) fativa, fructu æstivo parvo flavescente moschato. Tourn. Petit Muscat, i. e. *the Little Muscat*. This is a small Pear, rather round than long; the skin is very thin, and, when ripe, of a yellowish colour; the flesh is melting, and of a rich musky flavour, but will not keep long when ripe. This comes the end of July.
6. PYRUS (*Cuisse Madame*) fativa, fructu æstivo oblongo ferrugineo, carne tenerâ moschatâ. Tourn. *Cuisse Madame, Lady's Thigh, in England commonly called Jargonelle*. This is a very long Pear, of a pyramidal shape, having a long foot-stalk; the skin is pretty thick, of a russet green colour from the sun, but towards the sun it is inclined to an iron colour; the flesh is breaking, and has a rich musky flavour; ripe the beginning of August. This is one of the best early summer Pears yet known, and is certainly what all the French gardeners call the Cuisse Madame, as may be easily observed by their description of this Pear; but I suppose the titles of this and the Jargonelle were changed in coming to England, and have been continued by the same names.
7. PYRUS (*Windsor*) fativa, fructu oblongo, è viridi flavescente. *The Windsor Pear*. This is an oblong fruit, which swells toward the crown, but near the stalk is drawn toward a point; the skin is smooth, and, when ripe, of a yellowish green colour; the flesh is very soft, and, if permitted to hang but two or three days after it is ripe, grows meally, and is good for nothing.
8. PYRUS (*Jargonelle*) fativa, fructu æstivo oblongo, è viridi albo. *The Jargonelle, now commonly called Cuisse Madame*. This is certainly what the French gardeners call the Jargonelle, which, as I have before observed, is now in England, given to another fruit much preferable to this, so that the two names are changed; for the Jargonelle is always placed amongst those which the French call bad fruit, and the Cuisse Madame is set down amongst their best fruit, which is certainly the reverse with us, as they are now named. This Pear is somewhat like the Windsor, but is not so swelling toward the crown, and is smaller toward the stalk; the skin is smooth, of a pale green colour; the flesh is apt to be meally if it stands to be ripe, but, being a plentiful bearer, is much propagated for the London markets.
9. PYRUS (*Orange Musk*) fativa, fructu æstivo globoso sessili moschato, maculis nigris consperso. Tourn. *Orange Mosquée, i. e. the Orange Musk*. This is a middle-sized Pear, of a short globular form; the skin is of a yellowish colour, spotted with black; the flesh is musky, but is very apt to be a little dry and choaky. It ripens in August.
10. PYRUS (*Blanquet*) fativa, fructu æstivo albido majori. Tourn. *Gros Blanquet, i. e. Great Blanket*. This is also called La Musfette d'Anjou, i. e. the Bagpipe of Anjou. It is a large Pear approaching to a round form; the skin is smooth, and of a pale green colour; the flesh is soft, and full of juice, which hath a rich flavour; the stalk is short, thick, and spotted; the wood is slender, and the leaf is very much like that of the tree called the Jargonelle. This ripens the beginning of August.
11. PYRUS (*Musk Blanquet*) fativa, fructu æstivo albido saccharato odoratissimo. Tourn. *The Blanquette, or Musk Blanquette; the little Blanket Pear*. This Pear is much less than the former, and more pinched in near the stalk, which is also short, but slenderer than that of the former; the skin is soft, and of a pale green colour; the flesh is tender, and full of a rich musky juice; the wood of this tree is much stronger than that of the former, and the shoots are commonly shorter. This ripens the middle of August.

12. PYRUS (*Long-stalk Blanquet*) fativa, fructu æstivo albido, pediculo longo donato. Tourn. *Blanquette à longue queue, i. e. Long-stalked Blanket Pear*. This Pear is in shape somewhat like the former, but the eye is larger, and more hollow at the crown; toward the stalk it is somewhat plumper, and a little crooked; the skin is very smooth, white, and sometimes toward the sun is a little coloured; the flesh is between melting and breaking, and is full of a rich sugary juice. This ripens the middle of August.
13. PYRUS (*Skinless*) fativa, fructu æstivo oblongo rufescente saccharato. Tourn. *Poire sans Peau, i. e. the Skinless Pear*. It is also called Fleur de Guigne, i. e. Flower of Guigne; and by some, Rouffolet hâtif, i. e. the early Ruffelet. This is a middle-sized fruit, of a long shape, and a reddish colour, somewhat like the Ruffelet; the skin is extremely thin; the flesh is melting, and full of a rich sugary juice; the shoots are long and strait. This ripens the middle of August.
14. PYRUS (*Robine*) fativa, fructu æstivo turbinato, carne tenera saccharato. *Muscat Robine, i. e. the Musk Robine Pear*. This is also called Poire à la Reine, i. e. the Queen's Pear; Poire d'Ambre, i. e. the Amber Pear; and Pucelle de Xaintonge, i. e. the Virgin of Xaintonge. This is a small round Pear, of a yellowish colour when ripe; the flesh is between melting and breaking. It hath a rich musky flavour, and is a great bearer; it ripens the middle of August.
15. PYRUS (*Drone*) fativa, fructu æstivo turbinato moschato. *Le Bourdon Mosque, i. e. the Musk Drone Pear*. This is a middle-sized round fruit, whose skin is of a yellowish colour when ripe; the flesh is melting, and has a high musky juice, but it must not hang too long on the tree, for it is subject to grow meally in a short time. This ripens the end of August.
16. PYRUS (*Orange*) fativa, fructu æstivo globoso sessili, è viridi purpurascence saccharato odorato. Tourn. *Orange Rouge, i. e. the red Orange Pear*. This Pear hath been the most common of all the sorts in France, which was occasioned by the general esteem it was in some years since. This is a middle-sized round fruit, of a greenish colour, but the side next the sun changes to a purple colour when ripe; the flesh is melting, and the juice is sugared with a little perfume; the eye is very hollow, and the stalk is short. This ripens the end of August.
17. PYRUS (*Cassiolette*) fativa, fructu æstivo oblongo minori cinereo odorato. Tourn. *Cassiolette Priolet, Muscat Verd Lechevriou*. This is so called from its being shaped like a perfuming-pot. It is a long fruit, in shape like the Cuisse Madame, of an Ash colour; its flesh is melting, and full of a perfumed juice, but it is very apt to rot in the middle as soon as ripe, otherwise it would be esteemed an excellent Pear. It is ripe the end of August.
18. PYRUS (*Orange Musk*) fativa, fructu æstivo turbinato è viridi albido. *Orange Musquée, i. e. the Musk Orange Pear*. This is a large round Pear, in shape like a Bergamot; the skin is green, and the flesh is melting, but it is very subject to rot upon the tree, which renders it not near so valuable as some others. It ripens the end of August.
19. PYRUS (*Oignonnet*) fativa, fructu æstivo globoso è viridi purpurascence. Tourn. *Gros Oignonnet, i. e. the Great Onion Pear*. It is also called Amiré-roux, i. e. Brown Admired; and Roy d'Été, i. e. King of Summer; Archiduc d'Été, i. e. the Summer Archduke. This is a middle-sized round Pear, of a brownish colour next the sun; the flesh is melting, and the juice is passably good. This ripens the end of August.
20. PYRUS (*Averat*) fativa, fructu æstivo globoso sessili ex albido flavescence saccharato odorato. Tourn. *Robine*. It is also called Muscat d'Aoust, i. e. the August Muscat; Poire d'Averat, i. e. the Averat Pear; and Poire Royale, i. e. the Royal Pear. This is a roundish flat Pear, in shape very like a Bergamot; the stalk is long, strait, and a little spotted, and the eye is a little hollowed; the skin is smooth, and of a whitish yellow colour; the flesh is breaking, but not hard, and its juice is richly sugared and perfumed.

fumed. It is a great bearer, and is esteemed one of the best summer Pears yet known; it ripens the end of August.

21. PYRUS (*Rose*) fativa, fructu æstivo globoso sessili odorato. Tourn. *Poire-rose*, i. e. the *Rose-Pear*; and *L'Epine-rose*, i. e. the *Thorny Rose*. This is a short round fruit, shaped like the great Onion Pear, but much larger; of a yellowish green colour, but a little inclining to red on the side next the sun; the stalk is very long and slender; the flesh is breaking, and the juice is musky: this ripens the end of August. The shoots and the leaves of this tree are large.

22. PYRUS (*Pouchet*) fativa, fructu æstivo globoso albido saccharato. Tourn. *Poire du Pouchet*. This is a large, round, whitish Pear, shaped somewhat like the Besideri; the flesh is soft and tender, and the juice is sugary; this ripens the end of August.

23. PYRUS (*Parfumé*) fativa, fructu æstivo turbinato sessili saturatis rubente punctato. Tourn. *Poire de Parfumé*, i. e. the *perfumed Pear*. This is a middle-sized round fruit, whose skin is somewhat thick and tough, and of a deep red colour, spotted with brown; the flesh is melting, but dry, and has a perfumed flavour. This ripens the end of August.

24. PYRUS (*Boncrétien*) fativa, fructu æstivo oblongo magno, partim rubro, partim albido odorato. Tourn. *Boncrétien d'Été*, i. e. the *Summer Boncrétien*, or *Good Christian*. This is a large oblong fruit, whose skin is smooth and thin; the side next the sun is of a beautiful red colour, but the other side is of a whitish green; the flesh is between breaking and tender, and is very full of juice, which is of a rich perfumed flavour. It ripens the beginning of September.

25. PYRUS (*Salviati*) fativa fructu æstivo globoso, ex rubro albidoque flavescence saccharato odorato. Tourn. *Salviati*. This Pear is pretty large, round, and flat, very much like the Besideri in shape, but not in colour; the stalk is very long and slender, and the fruit is a little hollowed both at the eye and stalk; the colour is red and yellow next the sun, but on the other side is whitish; the skin is rough, the flesh is tender, but a little soft, and has no core; the juice is sugary and perfumed, somewhat like the Robine, but is not near so moist. This ripens the beginning of September.

26. PYRUS (*Caillot-rosat*) fativa, fructu æstivo globoso sessili rufescente odorato. Tourn. *Caillot-rosat*, i. e. the *Rose-water Pear*. This is a large round Pear, somewhat like the Messire Jean, but rounder; the stalk is very short, and the fruit is hollowed like an Apple, where the stalk is produced; the skin is rough, and of a brown colour; the flesh is breaking, and the juice is very sweet. This ripens the middle of September.

27. PYRUS (*Choak-Pear*) fativa, fructu æstivo longo, acerbitate strangulationem minitante. Tourn. *Poire d'Etrangillon*, i. e. the *choaky Pear*. The flesh is red. This is seldom preserved in gardens, so there needs no description of it.

28. PYRUS (*Roufflet*) fativa, fructu æstivo oblongo è ferrugineo rubente, nonnunquam maculato. *Poire du Roufflet*, i. e. the *Roufflet Pear*. This is a large oblong Pear; the skin is brown, and of a dark red colour next the sun; the flesh is soft and tender, without much core; the juice is agreeably perfumed, if gathered before it be too ripe. This produces larger fruit on an espalier than on standard trees: it ripens the middle of September.

29. PYRUS (*Prince's Pear*) fativa, fructu æstivo subrotundo, partim rubro, partim flavescence, odorato. *Poire de Prince*, i. e. the *Prince's Pear*. This is a small roundish Pear, of a bright red colour next the sun, but a yellowish colour on the opposite side; the flesh is between breaking and melting; the juice is very high-flavoured: it is a great bearer. This ripens the middle of September, but will keep a fortnight good, which is what few summer-fruits will do.

30. PYRUS (*Mouille-bouche*) fativa, fructu æstivo globoso viridi, in ore liquefcente. *Gros Mouille-bouche*, i. e. the *great Mouthwater Pear*. This is a large round

Pear with a smooth green skin; the stalk is short and thick; the flesh is melting, and full of juice, if gathered before it be too ripe, otherwise it is apt to grow meally. This ripens the middle of September.

31. PYRUS (*Bergamot d'Été*) fativa, fructu æstivo rotundo sessili saccharato, è viridi flavescence. *Bergamotte d'Été*, i. e. *Summer Bergamot*. This is by some called the Hamden's Bergamot. It is a pretty large, round, flat Pear, of a greenish yellow colour, and hollowed a little at both ends like an Apple; the flesh is melting, and the juice is highly perfumed. This ripens the middle of September.

32. PYRUS (*Bergamot Autumn*) fativa, fructu autumnali sessili saccharato odorato è viridi flavescence, in ore liquefcente. Tourn. *Bergamotte d'Automne*, i. e. the *Autumn Bergamot*. This is a smaller Pear than the former, but is nearly of the same shape; the skin is of a yellowish green, but changes to a faint red on the side next the sun; the flesh is melting, and its juice is richly perfumed. It is a great bearer, ripens the end of September, and is one of the best Pears of the season.

33. PYRUS (*Swiss Bergamot*) fativa, fructu autumnali turbinato viridi, striis sanguineis distincta. Tourn. *Bergamotte de Suisse*, i. e. the *Swiss Bergamot*. This Pear is somewhat rounder than either of the former; the skin is tough, and of a greenish colour, striped with red; the flesh is melting, and full of juice, but is not so richly perfumed as either of the former. This ripens the end of September.

34. PYRUS (*Beurré Rouge*) fativa, fructu autumnali suavissimo, in ore liquefcente. Tourn. *Beurré Rouge*, i. e. the *red Butter Pear*. It is called l'Amboise, and in Normandy Isambert; as also Beurré gris, i. e. the gray Butter; and Beurré vert, i. e. the green Butter Pear. All these different names of Beurrés have been occasioned by the difference of the colours of the same sort of Pear, which is either owing to the different exposure where they grew, or from the stock, those upon free stocks being commonly of a browner colour than those which are upon Quince stocks, whence some persons have supposed them to be different fruits, though in reality they are the same. This is a large long fruit, for the most part of a brown colour. The flesh is very melting, and full of a rich sugary juice. It ripens the beginning of October, and, when gathered from the tree, is one of the very best sort of Pears we have.

35. PYRUS (*Doyenne*) fativa, fructu autumnali turbinato sessili flavescence, & in ore liquefcente. Tourn. *Le Doyenne*, i. e. the *Dean's Pear*. It is also called by all the following names; Saint Michel, i. e. Saint Michael; Beurré blanc d'Automne, i. e. the white Autumn Butter Pear; Poire de Neige, i. e. the Snow Pear; Bonne Ente, i. e. a good Graft; the Carlisle, and Valentia. This is a large fruit, in shape somewhat like the gray Beurré, but is shorter and rounder; the skin is smooth, and, when ripe, changes to a yellowish colour; the flesh is melting, and full of juice, which is very cold, but it will not keep good much more than a week after it is gathered, being very subject to grow meally; it is a very indifferent fruit. This is a great bearer, and ripens the beginning of October.

36. PYRUS (*Verte-longue*) fativa, fructu autumnali longo viridique odorato, in ore liquefcente. Tourn. *La Verte-longue*, i. e. the *long green Pear*. It is also called Mouille bouche d'Automne, i. e. the Autumn Mouthwater Pear. This is a long fruit, which is very green when ripe; the flesh is melting, and very full of juice, which, if it grows upon a dry warm soil, and a free stock, is very sugary, otherwise it is but a very indifferent Pear. It ripens the middle of October, but some years they will keep till December.

37. PYRUS (*Messire Jean*) fativa, fructu autumnali tuberoso sessili saccharato, carne durâ. Tourn. *Messire Jean blanc & gris*, i. e. the *white and gray Monsieur John*. These, although made two sorts of fruit by many persons, are indubitably the same; the difference of their colour proceeding from the different soils

soils and situations where they grow, or the stocks on which they are grafted. This Pear, when grafted on a free stock, and planted on a middling soil, neither too wet nor over dry, is an excellent autumn Pear; but when it is grafted on a Quince stock, it is very apt to be stony; or if planted on a very dry soil, is very apt to be small and good for little, unless the trees are watered in dry seasons, which has rendered it less esteemed by some persons, who have not considered the cause of their hardness; for when it is rightly managed, there are not many Pears in the same season to be compared with it. This is a large roundish fruit, the skin is rough, and commonly of a brown colour; the flesh is breaking, and full of a rich sugared juice. It ripens the end of October, and will continue good near a month.

38. PYRUS (*Muscat flueri*) fativa, fructu autumnali globoso ferrugineo, carne tenerâ sapidissimâ. Tourn. *Muscat flueri*, i. e. the flowered Muscat. It is also called Muscat à longue queue d'Automne, i. e. the long-stalked Muscat of the Autumn. This is an excellent Pear, of a middling size, and round; the skin is of a dark red colour; the flesh is very tender, and of a delicate flavour. It ripens the end of October.
39. PYRUS (*Poire de Vigne*) fativa, fructu autumnali globoso ferrugineo, carne viscidâ. Tourn. *Poire de Vigne*, i. e. the Vine Pear. This is a round fruit, of a middling size; the skin of a dark red colour; the flesh is very melting, and full of a clammy juice; the stalk is very long and slender. The fruit should be gathered before it be full ripe, otherwise it grows meally and soon rots. It ripens the end of October.
40. PYRUS (*Rouffeline*) fativa, fructu autumnali oblongo, dilutè rufescente, saccharato, odoratissimo. Tourn. *Poire Rouffeline*, i. e. the Rouffeline Pear. It is also called in Touraine, Le Muscat à longue queue de la fin d'automne, i. e. the long-stalked Muscat of the end of autumn. This is by some English gardeners called the Brute-bonne, but that is a very different fruit from this. It is shaped somewhat like the Rouffelet, but the skin of this is smooth, and of a greenish yellow from the sun, but the side next the sun is of a deep red colour, with some spots of gray; the flesh is very tender and delicate; the juice is very sweet, with an agreeable perfume. It ripens the middle of October, but must not be long kept, lest it rot in the middle.
41. PYRUS (*Pendar*) fativa, fructu autumnali oblongo majori cinereo. Tourn. *Poire Pendar*, i. e. the Knave's Pear. This is very like the Cassiolette Pear, but is somewhat larger; the flesh is fine and tender; the juice is very much sugared. It ripens the end of October.
42. PYRUS (*Sucré vert*) fativa, fructu autumnali turbinato tuberoso viridi saccharato, in ore liquecente. Tourn. *Sucré vert*, i. e. The green Sugar Pear. This Pear is shaped like the Winter Thorn, but is smaller; the skin is very smooth and green; the flesh is very buttery; the juice is sugared, and of an agreeable flavour; but it is sometimes subject to be stony in the middle, especially if grafted on a Quince stock.
43. PYRUS (*Marquis*) fativa, fructu autumnali tuberoso sessili, è viridi flavescente, maculis nigris consperso, carne tenerâ saccharatâ. Tourn. *La Marquise*, i. e. the Marquis's Pear. This is often of two different shapes, according to the nature of the soil where they are planted; for when the soil is dry, the fruit very much resembles a fine Blanquet; but when the soil is very rich and moist, it grows much larger. It is a well-shaped Pear, flat at the top; the eye is small and hollowed; the skin is of a greenish yellow, a little inclining to red on the side next the sun. If this Pear does not change yellow in ripening, it is seldom good; but if it does, the flesh will be tender and delicate, very full of juice, which is sugared. It ripens the beginning of November.
44. PYRUS (*Chat-brulé*) fativa, fructu autumnali oblongo, partim albido, partim rufescente. *The Chat-brulé*, i. e. the Burnt Cat. It is also called Pucelle de Xaintogne, i. e. the Virgin of Xaintogne. This is a

small oblong Pear, shaped much like the Martin Sec, but differs from it in colour, this being of a pale colour on one side, but of a dark brown on the other; the skin is smooth; the flesh is tender, but dry, and, if kept a short time, is apt to grow meally. It is in eating the beginning of November.

45. PYRUS (*Besidéri*) fativa, fructu autumnali globoso sessili, ex albido flavescente. *Le Besidéri*. It is so called from Héri, which is a forest in Bretagne, between Rennes and Nantes, where this Pear was found. This is a middle-sized round Pear, of a pale green, inclining to a yellowish colour; the stalk is very long and slender; the flesh is dry, and but very indifferent for eating, but it bakes well. It ripens the middle of November.
46. PYRUS (*Crasane*) fativa, fructu brumali sessili, è viridi flavescente, maculato, utrinque umbilicato, in ore liquecente. Tourn. *The Crasane, or Bergamot Crasane*. It is also called Beurré Plat, i. e. the flat Butter Pear. This is a middle-sized Pear, hollowed at the crown like an Apple; the stalk is very long and crooked; the skin is rough, of a greenish yellow colour when ripe, covered over with a russet coat; the flesh is extremely tender and buttery, and is full of a rich sugared juice, and is the very best Pear of the season. This is in eating the middle of November.
47. PYRUS (*Dauphine*) fativa, fructu brumali turbinato sessili flavescente saccharato odorato, in ore liquecente. Tourn. *Lansac ou la Dauphine*, i. e. the Lansac or Dauphine Pear. This Pear is commonly about the size of a Bergamot, of a roundish figure, flat towards the head, but a little produced towards the stalk; the skin is smooth, and of a yellowish green colour; the flesh is yellow, tender, and melting; the juice is sugared, and a little perfumed; the eye is very large, as is also the flower, and the stalk is long and strait. When this Pear is upon a free stock, and planted on a good soil, it is one of the best fruits of the season; but when it is on a Quince stock, or upon a very dry soil, the fruit will be small, stony, and worth little. It ripens the end of November.
48. PYRUS (*Martin Sec*) fativa, fructu brumali oblongo, partim intensè, partim dilute ferrugineo, saccharato, odorato. Tourn. *Martin Sec*, i. e. the Dry Martin. This is sometimes called the Dry Martin of Champagne, to distinguish it from another Dry Martin of Burgundy. This Pear is almost like the Rouffelet in shape and colour, which has occasioned some persons to give it the name of Winter Rouffelet. It is an oblong Pear, whose skin is of a deep russet colour on one side, but the other side is inclining to a red; the flesh is breaking and fine; the juice is sugared, with a little perfume, and if grafted on a free stock, is an excellent Pear, but if it be on a Quince stock, it is very apt to be stony. It is in eating the end of November, but if they were permitted to hang their full time on the tree, will keep good two months.
49. PYRUS (*Bigarrade*) fativa, fructu brumali magno sessili, è cinereo flavescente. Tourn. *La Villaine d'Anjou*, i. e. the Villain of Anjou. It is also called Poire Tulipée, i. e. the Tulip Pear, and Bigarrade, i. e. the Great Orange. This is a large round Pear, with a very long slender stalk; the skin is of a pale yellow colour; the flesh is breaking, but not very full of juice. This is in eating the end of November.
50. PYRUS (*Poire de gros queue*) fativa, fructu brumali flavescente odoratissimo, pediculo crassiori. Tourn. *Poire de gros queue*, i. e. the large stalked Pear. This is a large roundish Pear, with a yellow skin; the stalk is very thick, from whence it had the name; the flesh is breaking and dry, and has a very musky flavour; but it is apt to be stony, especially if it be planted in a dry soil, or grafted on a Quince-stock, as are most of the perfumed Pears.
51. PYRUS (*Amadote*) fativa, fructu brumali turbinato rufescente odorato. *L'Amadote*, i. e. The Amadot Pear. This is a middle-sized Pear, somewhat long, but flat at the top; the skin is generally rough, and of a russet colour; the flesh is dry and high flavoured, if grafted on a free stock. The wood of this tree is generally

generally thorny, and is esteemed the best sort of Pear for stocks to graft the melting Pears upon, because it gives them some of its fine musky flavour. It is in eating the beginning of December, but will keep good six weeks.

52. PYRUS (*Bouvar*) fativa, fructu brumali, globoso, dilute virente, tuberoso, punctato, in ore liquecente. Tourn. *Petit Oin*, i. e. *Little Lard Pear*. It is also called Bouvar and Roufette d'Anjou, i. e. the Ruffet of Anjou; and Amadont, and Marveille d'Hyver, i. e. the Wonder of the Winter. This Pear is of the size and shape of the Ambret or Leschafferie, but the skin is of a clear green colour, and a little spotted; the stalk is pretty long and slender; the eye is large, and deeply hollowed; the flesh is extremely fine, and melting; the juice is much sugared, and has an agreeable musky flavour. It is in eating the middle of December, and is esteemed one of the best fruits in that season. This is better on a free stock than upon the Quince.

53. PYRUS (*Louisebonne*) fativa, fructu brumali, longo, è viridi albicante, in ore liquecente. Tourn. *Louisebonne*, i. e. *the Good Lewis Pear*. This Pear is shaped somewhat like the St. Germain, or the Autumn Verte-longue; but is not quite so much pointed; the stalk is very short, fleshy, and somewhat bent; the eye and the flower are small; the skin is very smooth; the colour is green, inclining to a pale colour when ripe; the flesh is extremely tender and full of juice, which is very sweet, especially when it grows upon a dry soil, otherwise it is apt to be very large and ill tasted. It is in eating the beginning of December.

54. PYRUS (*Colmar*) fativa, fructu brumali, tuberoso, è viridi flavescence, punctato, saccharato. Tourn. *Poire de Colmar*, i. e. *the Colmar Pear*. It is also called Poire Manne, the Manna Pear, and Bergamotte tardive, the late Bergamot. This Pear is somewhat like a Boncrétien in shape, but the head is flat; the eye is large, and deeply hollowed; the middle is larger than the head, and is sloped toward the stalk, which is short, large, and a little bent; the skin is green, with a few yellowish spots, but is sometimes a little coloured on the side next the sun; the flesh is very tender, and the juice is greatly sugared. It is in eating the latter end of December, but will often keep good till the end of January, and is esteemed one of the best fruits of that season.

55. PYRUS (*L'Eschafferie*) fativa, fructu brumali, globoso, citriformi, flavescence, punctato, in ore liquecente, saccharato, odoratissimo. Tourn. *L'Eschafferie*. It is also called Vertelongue d'Hyver, i. e. the Winter long green Pear, and Besidéri Landri, i. e. the Landry Wilding. This Pear is shaped like a Citron; the skin is smooth, and of a green colour, with some spots while it hangs on the tree, but as it ripens it becomes of a yellowish colour; the stalk is strait and long; the eye is small, and not hollowed; the flesh is melting, and buttery; the juice is sugared, with a little perfume. It is in eating the latter end of December.

56. PYRUS (*Virgouleuse*) fativa, fructu brumali longo, è viridi flavescence, in ore liquecente, saccharato. Tourn. *Le Virgoulé*, or *La Virgouleuse*. It is also called Bujaleuf, and Chambrette; and Poire de Glasse, i. e. the Ice Pear in Gascoigne; but it is called Virgoule, from a village of that name in the neighbourhood of St. Leonard in Limousin, where it was raised and sent to Paris by the Marquis of Chambret. This Pear is large, long, and of a green colour, inclining to yellow as it ripens; the stalk is short, fleshy, and a little bent; the eye is of a middling size, and a little hollowed; the skin is very smooth, and sometimes a little coloured towards the sun; the flesh is melting, and full of a rich juice. It is in eating the latter end of December, and will continue good till the end of January, and is esteemed one of the best fruits of the season; but the tree is very apt to produce vigorous shoots, and the blossoms being generally produced at the extreme part of the shoot, when

they are shortened, the fruit will be entirely cut away, which is the reason it is condemned as a bad bearer; but when it is grafted on a free stock, it ought to be allowed at least forty feet to spread; and if upon a Quince stock, it should be allowed upwards of thirty feet, and the branches trained in against the espalier or wall, at full length, in a horizontal position, as they are produced. Where this tree is thus treated, it will bear very plentifully, and the fruit will be good.

57. PYRUS (*Ambrette*) fativa spinosa, fructu globoso, fessili, ferrugineo, in ore liquecente, saccharato, odoratissimo. Tourn. *Poire d'Ambrette*. This is so called from its musky flavour, which resembles the smell of the Sweet Sultan Flower, which is called Ambrette in France. This Pear is like the Leschafferie in shape, but is of a ruffet colour; the eye is larger, and more hollowed; the flesh is melting, and the juice is richly sugared and perfumed; the seeds are large and black, and the cells in which they are lodged are very large; the wood is very thorny, especially when grafted on free stocks. The fruit is in eating the latter end of December, and continues good till the latter end of January, and is esteemed a very good fruit by most people.

58. PYRUS (*Epine d'Hyver*) fativa, fructu brumali, magno, pyramidato, albido, in ore liquecente, saccharato, odorato. Tourn. *Epine d'Hyver*, i. e. *Winter-thorn Pear*. This is a large fine Pear, nearly of a pyramidal figure; the skin is smooth, and of a pale green colour, inclining to yellow as it ripens; the stalk is short and slender; the flesh is melting and buttery; the juice is very sweet, and in a dry season, is highly perfumed; but when it is planted on a moist soil, or the season proves wet, it is very insipid, so that it should never be planted on a strong soil. It ripens the end of December, and will continue good two months.

59. PYRUS (*Saint Germain*) fativa, fructu brumali longo, è viridi flavescence, in ore liquecente. Tourn. *La Saint Germain*, i. e. *the St. Germain Pear*. It is also called L'Inconnue de la Fare, i. e. the Unknown of La Fare; it being first discovered upon the banks of a river which is called by that name, in the parish of St. Germain. This is a large long Pear, of a yellowish green colour when ripe; the flesh is melting, and very full of juice, which in a dry season, or if planted on a warm dry soil, is very sweet; but when it is planted on a moist soil, the juice is very apt to be harsh and austere, which renders it less esteemed by some persons, though in general it is greatly valued. This is in eating from the end of December till February.

60. PYRUS (*Saint Austin*) fativa, fructu brumali tuberoso subacido flavescence punctato. Tourn. *Saint Austin*. This is about the size of a middling Virgoulé Pear, but is somewhat shorter and slenderer near the stalk; the skin is of a fine Citron colour, spotted with red on the side next the sun; the flesh is tender, but not buttery, and is pretty full of juice, which is often a little sharp, which to some persons is disagreeable, but others value it on that account. This is in eating in December, and will continue good two months.

61. PYRUS (*Boncrétien d'Espagne*) fativa, fructu brumali pyramidato, partim purpureo, punctis nigris consperso, flavescence. Tourn. *Boncrétien d'Espagne*, i. e. *the Spanish Boncrétien*. This is a large Pear, of a pyramidal form, of a fine red or purple colour on the side next the sun, and full of small black spots; the other side is of a pale yellow colour, the flesh is breaking, and when it is on a light rich soil, and grafted on a free stock, its juice is very sweet. It ripens in the end of December, and will continue good a month or six weeks. If this be grafted on a Quince stock, it is very apt to be dry and stony. This is a very good fruit for baking.

62. PYRUS (*Poire de Livre*) fativa, fructu brumali, magno, oblongo, turbinato, ferrugineo, utrinque umbilicato. Tourn. *Poire de Livre*, i. e. *the Pound Pear*.

It is also called Gros Ratteau Gris, i. e. the gray raked Pear; and Poire d'Amour, i. e. the lovely Pear. In England this is called Parkinson's Warden, or the Black Pear of Worcester. This is a very large Pear, each of which commonly weighs a pound or more; the skin is rough, and of an obscure red colour on the side next the sun, but somewhat paler on the other side; the stalk is very short, and the eye is greatly hollowed. This is not fit for eating, but bakes or stews exceeding well, and is in season from December to March.

63. PYRUS (*Besi de Cassoy*) fativa, fructu brumali parvo flavescence, maculis rubris consperso. Tourn. *Besi de Cassoy*, i. e. *the Wilding of Cassoy*; a forest in Bretagne, where it was discovered, and passes under the name of Roufflet d'Anjou. It is also called Petit Beurre d'Hyver, i. e. Small Winter Butter Pear. This is a small oblong Pear, of a yellowish colour, spotted with red; the flesh is melting, and the juice is very rich. It is in eating in December and January. This is a prodigious bearer, and commonly produces its fruit in large clusters, provided it be not too much pruned; for it generally produces its blossom-buds at the extremity of its shoots, which if shortened, the fruit would be cut away. There was a tree of this kind in the gardens of Camden-house near Kensington, which generally produced a great quantity of fruit.
64. PYRUS (*Martin-fire*) fativa, fructu brumali turbinato inæquali, ventre tumido, partim purpureo, partim flavescence. Tourn. *Ronville*. It is also called Hocrenaille and Martin-fire, i. e. the Lord Martin Pear. This Pear is about the size and shape of a large Roufflet; the eye is of a middling size, and hollowed a little; the middle of the Pear is generally swelled more on one side than on the other, but is equally extended towards the stalk; the skin is very smooth and soft, and is of a lively red colour next the sun, but on the other side it changes yellow as it ripens. The flesh is breaking and full of juice, which is very sweet and a little perfumed; but if grafted on a Quince stock, is very apt to be small and stony.
65. PYRUS (*Citron d'Hyver*) fativa, fructu brumali citriformi flavescence duro moschato odoratissimo. Tourn. *Citron d'Hyver*, i. e. *the Winter Citron Pear*. It is also called the Musk Orange Pear, in some places. This is a pretty large Pear, in shape and colour very like an Orange or Citron, from whence it had its name. The flesh is hard and dry, and very subject to be stony, for which reasons it is not valued as an eating Pear, but will bake very well. It is in season from December to March.
66. PYRUS (*Roufflet d'Hyver*) fativa, fructu brumali oblongo, è viridi flavescence, saccharato, saporis austeri. Tourn. *Roufflet d'Hyver*, i. e. *the Winter Roufflet*. This is by some supposed to be the same Pear as is called the Dry Martin, but it is very different from that in several particulars. The colour of this is a greenish yellow, inclining to brown; the stalk is long and slender, and the flesh is buttery and melting, and generally full of juice, which is very sweet, but the skin is apt to contain an austere juice, so that if it be not pared, it is apt to be disagreeable to many persons palates. It is in eating in January and February.
67. PYRUS (*Portail*) fativa Pictaviensis, fructu brumali globoso sessili saccharato odorato. Tourn. *Poir Portail*, i. e. *the Gate Pear*. This Pear was discovered in the province of Poitou, where it was so much esteemed, that they preferred it to most other fruit, though in the opinion of the most curious judges, it does not deserve the great character which is given to it; for it rarely happens that it proves good for eating, being generally dry, stony, and hard, unless in extraordinary seasons, and upon a very good soil. This must always be grafted on a free stock, and should be planted on a light rich soil; and in very dry seasons the trees should be watered, otherwise the fruit will be stony. It is in season from January to March, and bakes well.

68. PYRUS (*Franc-real*) fativa, fructu brumali magno globoso flavescence, punctis rubris consperso. Tourn. *Franc-real*. It is also called Fin-or d'Hyver, i. e. the Golden End of Winter. This is a very large Pear, almost of a globular figure; the skin is yellow, spotted with red; the stalk is short, and the wood of the tree mealy. The flesh of this Pear is dry, and very apt to be stony, but it bakes exceeding well, and continues good from January till March.
69. PYRUS (*Easter Bergamot*) fativa, fructu brumali turbinato sessili subacido flavescence, punctis asperioribus consperso. Tourn. *Burgamotte Bugi*. It is also called Bergamotte de Pasque, i. e. the Easter Bergamot. It is a large Pear, almost round, but is a little produced in length towards the stalk; the eye is flat and the skin is green, having many rough protuberances like spots dispersed all over, but, as it ripens, becomes yellowish; the flesh is breaking, and in a good season the juice is sweet; but it must have a free stock, a south-east wall, and have a good soil, otherwise it is apt to be stony and austere. It is in eating from February till April.
70. LE (*Muscat of Germany*) MUSCAT D'ALAMAN, i. e. *The German Muscat*. This is an excellent Pear, more long than round, of the shape of the Winter-royal, but is less toward the eye, and is more russet, and of a red colour next the sun; it is buttery, melting, and a little musky. This is in eating in March, April, and sometimes in May, if it is well preserved.
71. LE BERGAMOTTE (*Holland Bergamot*) D'HOLLANDE, i. e. *The Holland Bergamot*. It is large and round, of the shape of the ordinary Bergamot. The colour is greenish, the flesh is half buttery and tender, the juice is highly flavoured. This is a very good Pear, and will keep till April.
72. LE POIRE (*Naples Pear*) DE NAPLES, i. e. *The Pear of Naples*. This is a pretty large, long, greenish Pear; the flesh is half breaking; the juice is sweet, and a little vinous. It is in eating in March. I am in doubt whether this Pear is not in some places taken for a Saint Germain, for there is a Pear in some gardens, very like the Saint Germain, which will keep till April, and this Pear agrees with the characters of that. It is called in England the Easter St. Germain.
73. PYRUS (*Boncrétien d'Hyver*) fativa, fructu brumali magno pyramidato, è flavo nonnihil rubente. Tourn. *Boncrétien d'Hyver*, i. e. *the Winter Boncrétien Pear*. This Pear is very large and long, of a pyramidal figure; the skin is of a yellowish colour, but the side next the sun inclines to a soft red; the flesh is tender and breaking, and is very full of rich sugared juice. This is esteemed in France one of the best winter Pears, but in England it is seldom so good; though I am fully satisfied, if it were grafted on a free stock, and planted in a good soil, against a wall exposed to the south-east, and the branches trained at full length, it might be rendered more acceptable than it is at present in England.
74. PYRUS (*Cadillac*) fativa, fructu brumali magno, cydoniæ facie, partim flavo, partim purpurea. Tourn. *Catillac*, or *Cadillac*. This is a large Pear, shaped somewhat like a Quince; the skin is for the most part of a yellow colour, but changes to a deep red on the side next the sun; the flesh is hard, and the juice austere, but it is a very good fruit for baking, and being a plentiful bearer, deserves a place in every good collection of fruit. It will be good from Christmas to April, or longer.
75. PYRUS (*Pastorelle*) fativa, fructu brumali oblongo flavescence, punctis rubris consperso. *La Pastorelle*. This Pear is of the size and shape of a fine Roufflet; the stalk is short and crooked; the skin is somewhat rough, of a yellowish colour, spotted with red; the flesh is tender and buttery, and when it grows on a dry soil, the juice is very sweet; but on a wet soil, or in moist years, it is subject to have an austere taste. This Pear is in eating in February and March.
76. PYRUS (*Double Fleur*) fativa, fructu brumali sessili, partim flavescence, partim purpurascence. Tourn. *La*

La Double Fleur, i. e. the double-flowering Pear. This is so called, because the flowers have a double range of petals or leaves. It is a large short Pear; the stalk is long and strait; the skin is very smooth, and of a yellowish colour, but the side next the sun is commonly of a fine red or purple colour. This is by some esteemed for eating, but it is generally too austere in this country for that purpose. It is the best Pear in the world for baking or composts. It is good from February to May.

77. PYRUS (*Saint Martial*) fativa, fructu brumali oblongo, partim flavescente, partim purpurascete. *Saint Martial.* It is also called in some places Poire Angélique, i. e. the Angelic Pear; and in the south of France, Poire Douce. This Pear is oblong, in shape like the Boncrétien, but not so large, and a little flatter at the crown; it has a very long stalk; the skin is smooth and yellowish, but on the side next the sun it turns to a purplish colour; the flesh is tender and buttery, and the juice is very sweet. This is in eating in February and March.

78. PYRUS (*Befi Chaumontelle*) fativa, fructu brumali oblongo, partim albedo, partim purpureo odorato, saccharato. *La Poire de Chaumontelle, or Befi de Chaumontelle, i. e. the Wilding of Chaumontelle.* This Pear is in shape somewhat like the Autumn Beurré, but is flatter at the crown; the skin is a little rough, of a pale green colour, but turns to a purplish colour next the sun; the flesh is melting; the juice is very rich, and a little perfumed. It is in eating from November to January, and is esteemed by some as the best late Pear yet known.

79. PYRUS (*Carmelite*) fativa, fructu brumali globoso sessili cinereo maculis amplis obscurioribus consperso. *Tourn. Carmelite.* This is a middle-sized Pear, of a roundish form; the skin is of a gray colour on one side, but is inclining to a red on the other, having some broad spots of a dark colour all over; the flesh is commonly hard and dry, so that it is not very much esteemed. It is in season in March.

80. PYRUS (*Union*) fativa, fructu brumali maximo pyramidato, dilute virente. *The Union Pear, otherwise called Dr. Uvedale's St. Germain.* This is a very large long Pear, of a deep green colour, but the side next the sun doth sometimes change to a red as it ripens. This is not fit for eating, but bakes very well; and being a great bearer, and a very large fruit, deserves a place in every good collection. It is in season from Christmas to April.

There are many other sorts of Pears, which are still continued in some old gardens; but as those here mentioned are the best sorts known at present, it would be needless to enumerate a great quantity of ordinary fruit; since every one who intends to plant fruit-trees, would rather chuse those which are the most valued, the expence and trouble being the same for a bad sort of fruit as a good one. Indeed I have inserted many more than are really worth planting, in order to please such who are fond of great variety; but whoever hath a mind to make choice of such only as are good, may easily distinguish them, by attending to the account given of each sort, and hereby every person is at liberty to please himself; for it is not every one who prefers a Beurré Pear, though that is generally esteemed the very best in its proper season; there are some who admire the Messire Jean, for the firmness of its flesh, which to others is a great objection against it; so that as some esteem the breaking, and others the melting Pears, I have distinguished them by their descriptions in such a manner, that every one may make choice of the kinds of fruit which are agreeable to their palates; and the different seasons in which each kind is in eating, being exhibited (allowing a little for the difference of seasons, which are earlier some years than others) it is not very difficult for a person to make a collection of good Pears to succeed each other throughout the season of these fruits, both for eating and baking.

The time of each fruit ripening, as here set down, is taken at a medium for seven years, and in the neigh-

bourhood of London, where all sorts of fruit generally ripen a fortnight or three weeks earlier than in almost any part of England; and it is very obvious to every person who will attend to the culture of fruit-trees, that their time of ripening is accelerated by long cultivation; for many of the sorts of Pears, which some years past rarely became ripe in England, unless they grew against the best aspected walls, are now found to ripen extremely well on espaliers and dwarfs; and those Pears which seldom were in eating till January, are ripe two months earlier. There is also a very great difference in their time of ripening in different seasons, for I have known the fruit of a Pear-tree in one year all ripe and gone by the middle of October, and the very next year the fruit of the same tree has not been fit to eat till the end of December, so that allowance should be made for these accidents. The Befi de Chaumontelle Pear, about forty years past, was seldom fit to eat before February, and has continued good till the middle of April, but now this Pear is commonly ripe in November; and when it is planted on a warm soil, and against a good aspected wall, it is in eating the middle or end of October. This forwarding of the several kinds of Pears, may be in some measure owing to the stocks upon which they are grafted; for if they are grafted upon early summer Pear stocks, they will ripen much earlier than when they are upon hard winter Pear stocks; and if some of the very soft melting Pears were grafted upon such stocks as are raised from the most austere fruit, such as are never fit to eat, and of which the best perry is made, it would improve those fruits, and continue them much longer good; or if the common free stocks were first grafted with any of these hard winter Pears, and when they have grown a year, then to graft or bud these soft melting Pears upon them, it would have the same effect; but the Pears so raised will require a year's more growth in the nursery, and consequently cannot be sold at the same price as those which are raised in the common method, these requiring to be twice budded or grafted, so that there is double labour, beside standing a full year longer; but this difference in the first expence of the trees, is not worth regarding by any person who is desirous to have good fruit; for the setting out in a right way is that which every one should be the most careful of, since by mistaking at first, much time is lost, and an after expence of new trees often attends it.

Another cause of fruits ripening earlier now than they formerly did, may be from the length of time they have been cultivated; for it is very certain, that most sorts of plants have been greatly forwarded and improved by culture, within the space of thirty or forty years, as may be known from the several sorts of esculent plants, which are cultivated in the kitchen-gardens, and of which sorts there are many which are annually improving: and if we look back to the best French authors who have written on the subject of fruit-trees, we shall find, that the times of ripening of many sorts of Pears are put down a month or six weeks later about fifty or sixty years ago, than they are now found to ripen about Paris; and here about London it is much the same, for I cannot find they are the least forwarder in the times of their ripening at Paris than at London.

The ripening of these fruits may also be accelerated by the method of pruning and managing these trees, which are greatly improved within the space of a few years past; for if we look into the directions which are given by the best writers on this subject, we shall soon discover how little they knew fifty years ago, of the true method of pruning and managing most sorts of fruit-trees, scarce one of them making any difference in the management of the different kinds of fruit. Pears are propagated by budding or grafting them upon stocks of their own kind, which are commonly called free stocks, or upon Quince stocks, or White-thorn, upon all which these fruits will take; but the latter sort of stock is now seldom used, because they never

never keep pace in their growth with the fruit budded or grafted upon them; as also because the fruit upon such stocks are commonly drier, and more apt to be stony, than when they are upon Pear stocks. Quince stocks are greatly used in the nurseries for all sorts of Pears which are designed for dwarfs or walls, in order to check the luxuriance of their growth, so that they may be kept within compass better than upon free stocks. But against the general use of these stocks, for all sorts of Pears indifferently, there are very great objections: 1st, Because some sorts of Pears will not thrive upon these stocks, but in two or three years decay, or at most will but just keep alive. 2dly, Most of the sorts of hard breaking Pears are rendered stony, and good for little; so that whenever any of these sorts are thus injudiciously raised, the fruit, although the kind be ever so good, is condemned as good for nothing by such as are not well acquainted with it, when the fault is entirely owing to the stock on which it was grafted. On the contrary, most melting buttery Pears are greatly improved by being upon Quince stocks, provided they are planted on a strong soil; but, if the ground be very dry and gravelly, no sort of Pear will do well upon Quince stocks in such places.

These general directions being given, there is no occasion to repeat any part of the method in which these stocks are raised, and the fruits budded or grafted thereon, which has been already mentioned under the article of NURSERIES.

The distance which these trees should be planted either against walls or espaliers, must not be less than forty feet; for if they have not room to spread on each side, it will be impossible to preserve them in good order, especially those on free stocks, for the more these trees are pruned, the more they will shoot; and, as I said before, many sorts of Pears produce their blossom-buds first at the extremity of the former year's shoots, so that when they are shortened, the fruit will be cut away, and this cannot be avoided, where the trees have not room allowed in their first planting.

This distance, I doubt not, will be objected to by many who have not fully attended to the growth of these trees, especially as it hath been the general practice of most gardeners to plant these trees at less than half the distance which is here mentioned; but, whoever will be at the trouble to view any of these trees which have been some years standing, they will always find, if by accident, one of these trees has been planted against a building, where the branches have had room to spread, that this tree has produced more fruit than twelve trees which have been crowded close, and have not room for their branches to extend. There are some Pear-trees now growing, which spread more than fifty feet in length, and are upward of twenty feet high, which produce a much greater quantity of fruit than if there had been three trees in the same room they would have done, as there are examples enough to prove, where trees are planted against houses and the ends of buildings at about twelve feet, or much less distance, because there is height of walling for them to grow, which is the reason commonly given by those who plant these trees so close together. But one tree will bear more fruit, when the branches are trained horizontally, than three or four trees, whose branches are led upright, and there never can be any danger of the upper part of the wall being left naked or unfurnished; for I have seen a Pear-tree which has spread more than fifty feet in width, and covered the wall upward of thirty-six feet in height; this was a summer Boncrétien Pear, and was extremely fruitful, which rarely happens to this sort when they are not allowed a large share of room. The finest tree of this sort of Pear, which I have ever seen, was a large standard-tree in my own possession, whose stem was not more than ten feet high, where the branches came out regularly on every side, and extended near thirty feet from the trunk, many of which were by the weight of the fruit in summer

brought down to the ground, so they were obliged to be supported with poles all around the tree toward the extremity of the branches, to prevent their lying upon the ground; and this tree had its branches so disposed as to form a natural parabola of forty feet in height, bearing from the lowest to the highest branches; so that in a kindly season, when the blossoms escaped the frost, it hath produced upward of two thousand Pears, which were much better flavoured than any of the same sort which I have yet tasted. This instance I mention, only to shew how much one of these trees will spread, if proper room be allowed it; and also to observe, that as the branches of this tree had never been shortened, they were fruitful to their extremities. This shews the absurdity of the French gardeners, who do not allow more than ten or twelve feet distance to these trees; and some of their most improved writers on this subject have advised the planting an Apple-tree between the Pear-trees, where they are allowed twelve feet; and yet these authors afterward say, that a good Pear-tree will shoot three feet each way in one year; therefore, according to their own observation, the trees so planted will have their branches meet together in two or three years at most, and what must be the case with such trees in five or six years is not difficult to know. But this method of planting has not been peculiar to the French, for most of the gardens in England have been little better planted. Indeed, those persons who were intrusted with the making and planting most of the English gardens, had little skill of their own, so were obliged to follow the directions of the French gardeners; of whom they had so great an opinion, as to get their books translated, and to these have added some trifling notes, which rather betray their weakness; for, where they have objected to the little room which their authors had allowed to these trees, they have, at the most, allowed them but three feet more; from which it is plain, they had not considered the natural growth of the trees, and whoever departs from nature, may be justly pronounced an unskilful gardener.

As most of the English gardens have been made and planted by persons of little judgment, it is very rare to find any of them which produce much fruit; for although many of these gardens have been totally altered and new planted, yet they have seldom been much altered for the better; and the possessors have been put to the expence of removing the old trees, also the earth of their borders, and to purchase new trees, which have been planted perhaps a foot or two farther asunder, than the old trees which were removed; so that when the young trees have grown a few years, they were in the same condition as the old, and it will be the loss of so many years to the owner: but this will constantly be the case, when it is the interest of the persons employed, who can sell so many young trees; and the planting of three times the number of trees in a garden, more than is proper, may in some measure be ascribed to the same, though in many instances I shall be inclinable to think they have proceeded from ignorance, rather than design. But where fruit-trees have been thus injudiciously planted, if the stocks are healthy and good, the best way to recover this loss is to dig up two or three, and leave every third or fourth tree, according to the distance which they were planted, and spread down the branches of those which are left horizontally; I mean, all such as are capable of being so brought down: but those which are too stubborn for this, should be cut off near the stem, where there will be new shoots enough produced to furnish the wall or espalier; and if the sort of fruit is not the same as desired, the young branches may be budded the same summer, or grafted the following spring with any other sort of Pear, and hereby many years may be saved; for one of these old trees so budded or grafted, will spread to a much greater length, and produce more fruit, when thus managed, in three years, than a new tree will in ten or twelve, especially if the ground

ground is mended. This is a method which I have practised with great success, where I have been employed to mend the blunders of these great gardeners, as they are stiled, and hereby the walls and espaliers have been well furnished in a few years.

But the next thing to be done, after being furnished with proper trees, is the preparing the ground to receive them; in the doing of which, there should be great regard had to the nature of the soil, where the trees are to grow; for, if it is a strong stiff land, and subject to wet in the winter, the borders should be raised as much above the level of the ground as you conveniently can. And if under the good soil there is a sufficient quantity of lime, rubbish, or stones laid to prevent the roots of the trees from running downward, it will be of great service to the trees. The borders for these should not be less than eight feet broad, but, if they are twelve, it will be still better. And as these borders may be planted with such sorts of esculent plants as do not grow large, or whose roots do not grow deep, or mat together on the surface, these will do no harm to the Pear-trees; for these are not so nice in their culture as Peach and Nectarine-trees, so the turning the ground, and mending it for these crops, will rather improve than injure the trees, provided the plants do not shade the trees, or are not suffered to stand too long upon the borders. But all the Cabbage kind, as also Beans, should be excluded from these borders, because they root deep in the ground, and draw much nourishment from the trees.

But if the soil is shallow, and the bottom is either gravel or chalk, there must be a sufficient depth of good earth laid upon the borders, so as to make them two feet and a half deep; for if the ground is not of this depth, the trees will not thrive well. And, in doing of this, I must caution every person not to dig out the gravel or chalk in a trench, (as is by some practised) and fill this trench with good earth; for by so doing, when the roots of the trees are extended to the width of the trench, they will meet with the gravel which will stop them, so that they will be confined, as if they were in tubs of earth, whereby the trees will soon shew their distress; therefore, when the gravel or chalk is removed, it should be entirely taken away over the whole border, otherwise it will be better to raise the whole border above it.

If the garden is to be new-made from a field, then all the good earth on the surface should be carefully preserved; and, if the good ground is taken out where the walks are designed to be made, and laid upon the borders, or in the quarters, it will add to the depth of the soil, and save expence in bringing in of new earth. If the ground can be prepared one year before it is planted, the trees will thrive the better; for by laying the ground in ridges, and turning it over two or three times, it will loosen the soil, and render it much better for planting; but in trenching or ploughing of the ground, there should be great care taken not to go deeper than the ground is good, otherwise all the good soil will be buried below the roots, and the bad ground will be turned on the top, which is what I have known done at a great expence by persons, who have been at the top of their profession, and have thereby entirely ruined the gardens.

Where there is a necessity of bringing any fresh earth for the borders, it will be proper to do it as soon as possible, and to mix this with the surface of the earth of the borders, that it may be turned over two or three times, that the parts may be well mixed and incorporated before the trees are planted; and, if some very rotten dung is added to this, it will greatly improve it. In chusing of the earth which is to be brought into the garden, there should be this care, viz. That if the natural soil of the garden is light and dry, then the new earth should be loamy and stiff; but where the natural soil is strong or loamy, then the new earth should be light and sandy, which will loosen the parts of the natural soil, and greatly mend it.

There are some persons who recommend laying the

whole depth of the borders with what they call virgin earth, that is, such as is taken from a pasture where the land has not been ploughed; but if this is not brought into the garden at least one year before the trees are planted, that by turning it over often it may be sweetened, it will not be so good as that which is taken from a kitchen-garden, where the land is good, and has been well wrought; for by often turning and breaking the soil, it will be better prepared to receive the trees.

Others recommend mixing a great quantity of rotten dung with the earth of the borders, but this is not so proper; for, by making the ground too rich, it will only encourage the luxuriant growth of the trees; therefore it is always better to mend the borders from time to time as they may require, and not to add so much dung in the first making them.

Another care is required in making the borders on wet ground, which is to contrive some covered drains to convey off the water in winter, otherwise, by this being detained about the roots of the trees, it will greatly prejudice them; and in building the walls round a kitchen-garden, where the ground is inclinable to be wet, there should be some arches turned in the foundations of those walls which are in the lowest part of the garden, to let off the wet.

The manner of preparing these trees for planting is the same as hath been directed for other fruit-trees, viz. to cut off all the small fibres from the roots, and to shorten some of the longest roots, and cut off all the bruised ones, or such as shoot downright; this being done, you should plant them in the places intended at the before-mentioned distance. The best time to plant these trees (if upon a middling or dry soil) is in October or November, leaving their heads on till spring, which should be fastened either to the walls or stakes, to prevent the wind from disturbing their roots; and in the beginning of March their heads should be cut off in the manner already directed for Peaches and other fruit-trees, observing also to lay some mulch upon the surface of the ground about their roots when they are planted, as hath been several times already directed for other trees; but in wet ground the trees may be planted in February, or the beginning of March, at any time before the buds are much swelled, but these may be cut down when they are planted.

The first summer after planting, the branches should be trained to a wall or espalier (against which they are planted) in a horizontal position, as they are produced, without shortening them; and the Michaelmas following, some of these shoots should be shortened down to five or six eyes, in order to obtain a sufficient quantity of branches, to furnish the lower part of the wall or espalier; but the shoots ought not to be shortened, unless where there is a want of branches to fill a vacancy; therefore the less a knife is used to these trees, the better they will succeed; for, whenever the shoots are stopped, it occasions the buds immediately below the cut to send forth two or more shoots, whereby there will be a confusion of branches, and rarely any fruit is produced with this management.

The distance which the branches of Pears should be trained, must be proportioned to the size of their fruit; therefore such sorts, whose fruit are small, may be allowed five or six inches, but the larger sorts must not be less than seven or eight inches asunder. If this be duly observed, and the branches carefully trained horizontally as they are produced, there will be no occasion for so much cutting as is commonly practised on these trees, which, instead of checking their growth, does, on the contrary, cause them to shoot the stronger.

It is very surprising to read the tedious methods, which most of the writers on fruit-trees have directed for pruning these trees; for, by their prolix and perplexed methods, one would imagine they had endeavoured to render themselves as unintelligible as possible; and this, I am sure, may be affirmed, That it is next to impossible for a learner ever to arrive at

any tolerable skill in pruning, by the tedious and perplexed directions which are published by Monsieur Quintiny, and those who have copied from him; for, as these have all set out wrong in the beginning, by allowing their trees less than half the distance which they should be planted, they have prescribed rules to keep them within that compass, which are the most absurd, and contrary to all reason, therefore should not be practised by those persons who are desirous of having plenty of fruit.

I shall therefore only lay down a few necessary directions for pruning and managing these trees, which shall be done in as few words as possible, that a learner may the more easily understand it, and which (together with proper observations) will be sufficient to instruct any person in the right management of them.

Pear-trees generally produce their blossom-buds first at the extremity of the last year's shoots, so that if these are shortened, the blossoms are cut off; but this is not all the damage, for (as I before said) this occasions the buds immediately below the cut to put forth two or more shoots, whereby the number of branches will be increased, and the tree crowded too much with wood; besides, those buds, which by this management produce shoots, would have only produced cursons or spurs, upon which the blossom-buds are produced, if the leading branch had not been shortened; therefore these should never be stopped, unless to furnish wood to fill a vacancy.

It is not necessary to provide a new supply of wood in Pear-trees, as must be done for Peaches, Nectarines, &c. which only produce their fruit upon young wood; for Pears produce their fruit upon cursons or spurs, which are emitted from branches which are three or four years old; which cursons continue fruitful many years, so that, where these trees have been skilfully managed, I have seen branches which have been trained horizontally upwards of twenty feet from the trunk of the tree, and have been fruitful their whole length. And if we do but carefully observe the branches of a healthy standard-tree, which has been permitted to grow without pruning, we shall find many that are ten or twelve years old, or more, which are very full of these cursons, upon which a good number of fruit is annually produced.

During the summer season these trees should be often looked over to train in the shoots, as they are produced, regularly to the wall or espalier, and to displace fore-right and luxuriant branches as they shoot out, whereby the fruit will be equally exposed to the air and sun, which will render them more beautiful and better tasted than when they are shaded by the branches; and by thus managing the trees in summer, they will always appear beautiful, and in winter they will want but little pruning.

Where Pear-trees are thus regularly trained without stopping their shoots, and have full room for their branches to extend on each side, there will never be any occasion for disbarking the branches, or cutting off the roots (as hath been directed by several writers on gardening;) which methods, however they may answer the intention for the present, yet will certainly greatly injure the trees, as must all violent amputations, which should ever be avoided as much as possible on fruit-trees; and this, I am sure, can never be wanted, where trees have been rightly planted, and regularly trained, while young.

The season for pruning these trees is any time after the fruits are gathered, until the beginning of March; but the sooner it is done after the fruit is gathered, the better, for reasons already given for pruning of Peach-trees; though indeed the deferring of these until spring, where there are large quantities of trees to prune, is not so injurious to them, as to some tender fruits; but if the branches are regularly trained in summer, and the luxuriant shoots rubbed off, there will be little left to do to them in winter.

All the sorts of Summer Pears will ripen very well either on standards, dwarfs, or espaliers, as will all Autumn Pears upon dwarfs or espaliers; but, where

a person is very curious in his fruit, I would always advise the planting them against espaliers, in which method they take up but little room in a garden, and, if they are well managed, appear very beautiful; and the fruit is larger and better tasted than those produced on dwarfs, as hath been already observed; but some of the Winter Pears must be planted against east, south-east, or south-west walls, otherwise they will not ripen well in England in bad seasons.

But although this may be the case with some of the late Winter Pears in very bad seasons, yet, in general, most sorts of them will ripen extremely well in all warm situations, when they are planted in espalier, and the fruit will be better flavoured than that which grows against walls, and will keep much longer good; for, as the heat against walls which are exposed to the sun will be very great at some times, and at others there will be little warmth, all fruit which grow near them, will be hastened unequally, and therefore is never so well flavoured as the same sorts are which ripen well in the open air; and all the fruit, which is ripened thus unequally, will decay much sooner than those which ripen gradually in the open air; therefore those Winter Pears which grow in espalier, may be kept six weeks longer than those which grow against walls, which is a very desirable thing; for to have plenty of these fruit at a season when it is very rare to find any other fruit to supply the table but Apples, is what all lovers of fruit must be greatly pleased to enjoy; which is what may be effected by planting many of the late sorts in espalier, where, although the fruit will not be so well coloured as those from the walls, yet they will be found exceeding good. When the *Befi de Chaumontelle* came first to England, the trees were planted in espalier, and some of them not on a very good soil, or in a warm situation, and yet from these trees I have eaten this Pear in great perfection in April, and sometimes it has kept till May; whereas, all those which have been since planted against walls ripen their fruit by the beginning of November, and are generally gone by the middle of December; nor are the latter so well tasted as those off the espaliers.

The *Virgoleuse* and *St. Germain*, as also the *Colmar*, are esteemed the most difficult sorts to ripen their fruit, yet these I have eaten in great perfection from espaliers, and often from standard-trees, where they grew upon a warm soil; but the fruit was much smaller on the standard-trees than those of the same sorts which grew against walls or espaliers, but they were full as well flavoured, and some of these sorts I have eaten good, in April, which is two months later than they usually keep; but yet I would not advise the planting these late Pears in standard-trees, because they should hang very late on the trees in autumn, at which season the winds are generally very high; and these standard-trees being much exposed, the fruit is often blown off the trees before they are ripe; and those of them, which may hang on the trees, are frequently bruised by being forced against the branches by the winds, so that they seldom keep well. What I mentioned this for, is to prove, that these Pears will ripen very well without the assistance of a wall; so that if they are planted in espaliers where the trees are kept low, the fruit will not be so much exposed to the strong winds in autumn as those on the standards, therefore can be in no danger of the fruit coming to perfection; and as the trees in espaliers will be constantly pruned, and managed in the same manner as those against walls, the fruit will be as large on those trees; therefore, where a person has a warm situation and a kindly soil, I would not advise the being at an expence to build walls on purpose for Pears, but to plant them against espaliers: and where there is any one who is very curious in having plenty of these fruit, and will be at the expence to procure them, I should advise having a sufficient quantity of Reed mats made to fix up against the back of the espalier in the spring, when the trees are in blossom, which will screen them from

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from cold winds, and preserve the tender fruit until they are past danger, when the Reeds may be taken down, and put under a shed to preserve them from the weather; and if the autumn should prove bad, these Reeds may be fixed up again, which will forward the ripening of the fruit, and also prevent the winds from blowing down, and bruising it. These Reeds may be purchased for one shilling per yard, running measure, at six feet and a half high; and if they are carefully laid up, and kept from the weather, these Reeds will last seven or eight years, so that the expence will not be very great; and when the advantages which these are of to the fruit are considered, I believe no person will object to the use of them.

But after the fruit is set and growing, there will be farther care necessary in order to have the fruit good; for it is not enough to have preserved a good crop of fruit on the trees, and then leave them entirely to nature during the season of their growth, but there will require some skill and attendance on the trees to help nature, or supply the deficiency of seasons; for beside the pruning and training trees in the manner before directed, there will also be wanting some management of their roots, according to the nature of the soil, and the difference of seasons. In all strong land, where the ground is apt to bind very hard in dry weather, the surface of the borders should be now and then forked over to loosen the earth, which will admit the showers and large dews to penetrate and moisten the ground, and be of great service to the trees and fruit, and also prevent the growth of weeds. And if the soil is light and dry, and the season should prove hot and dry, there should be large hollows made round the stems of the trees to hold water; and into each of these there should be poured eight or nine pots of water, which should be repeated once in a week or ten days during the months of June and July, if the season should continue dry. There should also be some mulch laid over the surface of these hollows, to prevent the sun and air from drying the ground. Where this is practised, the fruit will be kept constantly growing, and prove large and plump; whereas, if this is omitted, the fruit will often be small, grow crooked, crack, and fall off from the trees. For if the fruit is once stunted in their growth, and rain should fall plentifully after, it will occasion a great quantity of fruit to fall off the trees, and those which remain to ripen will not keep so long as those which never receive any check in their growth; and it is from this cause, that some years the fruit in general decays before the usual time. For after it has been for some time stunted in its growth, and then the season proves favourable, whereby it receives a sudden growth, it becomes so replete with juice, as to distend the vessels too suddenly, so that they will not be firm, which occasions their decay; therefore it is always best to keep the fruit constantly in a growing state, whereby it will acquire a proper size, and be rendered better flavoured.

There will also be required some dressing to the ground near the fruit-trees; but this should be laid on in autumn, after the trees are pruned. This dressing should be different, according to the nature of the soil; if the land is warm and dry, then the dressing should be of very rotten dung, mixed with loam; and if this is mixed six or eight months before it is laid upon the borders, and three or four times turned over, it will be the better; as will also the mixture, if it is made with neat's or hog's dung, both which are colder than horse dung, so more proper for hot land. But in cold stiff land, rotten horse dung, mixed with light sandy earth, or sea-coal ashes, will be the most proper, as this will loosen the ground and add a warmth to it.

These dressings should be repeated every other year, otherwise the trees will not thrive so well, nor will the fruit be so good. For, notwithstanding what many persons have advanced to the contrary, yet experience

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is against them; for the finest fruit in England, both as to size and flavour, is produced on land which is the most dunged and worked. Therefore I would advise trenching the ground about the fruit-trees very well every winter, for I am sure they will find it answer their expectations who shall practise this method. And where the ground in the quarters is well dressed and trenched, the fruit-trees will partake of the benefit; for as the trees advance in their growth, so their roots are extended to a great distance from their stems; and it is chiefly from the distant roots that the trees are supplied with their nourishment; therefore dressing the borders only, will not be sufficient for fruit-trees which are old.

In gathering of Pears, great regard should be had to the bud which is formed at the bottom of the foot-stalk, for the next year's blossoms; which, by forcing off the Pear before it be mature, is many times spoiled; for while the fruit is growing, there is always a bud formed by the side of the foot-stalk upon the same spur, for the next year's fruit; so that when the Pears are ripe, if they are gently turned upward, the foot-stalk will readily part from the spur, without injuring the bud.

The season for gathering all Summer Pears is just as they ripen, for none of these will remain good above a day or two after they are taken from the tree; nor will many of the Autumn Pears keep good above ten days or a fortnight after they are gathered. But the winter fruits should hang as long upon the trees as the season will permit; for they must not receive the frost, which will cause them to rot, and render their juices flat and ill tasted; but if the weather continue mild until the end of October, it will then be a good season for gathering them in, which must always be done in dry weather, and when the trees are perfectly dry.

In the doing of this you ought carefully to avoid bruising them, therefore you should have a broad flat basket to lay them in as they are gathered; and when they are carried into the store-room, they should be taken out singly, and each sort laid up in a close heap on a dry place, in order to sweat, where they may remain for ten days or a fortnight; during which time the windows should be open to admit the air, in order to carry off all the moisture which is perspired from the fruit; after this, the Pears should be taken singly, and wiped dry with a woollen cloth, and then packed up in close baskets, observing to put some Wheat straw in the bottoms, and round the sides of the baskets, to prevent their bruising against the baskets. And if some thick soft paper is laid double or treble all round the basket, between the straw and the Pears, this will prevent the Pears from imbibing the musty taste which is communicated to them by the straw, when they are contiguous; which taste often penetrates through the skin so strongly, that when the fruit is pared, the taste will remain. You should also observe to put but one sort of fruit into a basket, lest by their different fermentations, they should rot each other; but if you have enough of one sort to fill a basket which holds two or three bushels, it will be still better. After you have filled the baskets, you must cover them over with Wheat straw very close, first laying a covering of paper two or three times double over the fruit, and fasten them down; then place these baskets in a close room, where they may be kept dry and from frost; but the less air is let into the room, the better the fruit will keep. It will be very necessary to fix a label to each basket, denoting the sort of fruit therein contained, which will save the trouble of opening them, whenever you want to know the sorts of fruit; besides, they ought not to be opened before their season to be eaten, for the oftener they are opened and exposed to the air, the worse they will keep. I do not doubt but this will be objected to by many, who imagine fruit cannot be laid too thin; for which reason, they make shelves to dispose them singly upon, and are very fond of admitting fresh air, whenever the weather is mild, supposing

supposing it very necessary to preserve the fruit; but the contrary of this is found true, by those persons who have large stocks of fruit laid up in their store-houses in London, which remain closely shut up for several months, in the manner before related; and when these are opened, the fruit is always found plumper and sounder than any of those fruits which were preserved singly upon shelves, whose skins are always shrivelled and dry. For (as Mr. Boyle ob-

serves) the air is the cause of putrefaction; and, in order to prove this, that honourable person put fruits of several kinds into glasses where the air was exhausted, in which places they remained sound for several months, but, upon being exposed to the air, rotted in a very short time after; which plainly shews the absurdity of the common method now used, to preserve fruit.

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QUAMOCUIT. See IPOMOEIA.
QUERCUS. Tourn. Inst. R. H. 582. tab. 349. Lin. Gen. Plant. 949. [so called of *κέρω*, Gr. to make rough; either from the roughness of its bark, or because of its austerity.] The Oak-tree; in French, *Chêne*.

The CHARACTERS are,

It hath male and female flowers on the same tree; the male flowers are disposed in a loose catkin; these have an empalement of one leaf, divided into four or five segments; they have no petals, but many short stamina, terminated by large twin summits. The female flowers which sit close to the buds, have a hemispherical thick empalement of one leaf, which is rough and entire, almost hiding the flower, which has no petal, but a small oval germen, supporting a single five-pointed style, crowned by single permanent stigmas. The germen afterward becomes an oval nut (or acorn) with a thick cover, having one cell, whose base is fixed into the empalement or cup.

This genus is ranged in the eighth section of Linnaeus's twenty-first class, which includes those plants which have male and female flowers on the same plant, whose male flowers have many stamina. He joins to this genus the *Ilex* and the *Suber* of Tournefort, whose characters are the same as the Oak.

The SPECIES are,

1. **QUERCUS (Robur)** foliis deciduis oblongis, supernè latoribus sinubus acutioribus, angulis obtusis petiolatis glandibus sessilibus. Oak with oblong deciduous leaves, broader toward the top, having acute indentures, with obtuse angles, which have long foot-stalks, and acorns sitting close to the branches. *Quercus latifolia* mas, quæ brevi pediculo est. C. B. P. 419. Broad-leaved male Oak, the fruit of which has short foot-stalks, or common Oak.
2. **QUERCUS (Femina)** foliis deciduis oblongis obtusis, pinnato-sinuatis petiolis brevissimis, pedunculis glandorum longissimis. Oak with oblong, obtuse, deciduous leaves, which are winged, sinuated, and have very short foot-stalks, with a fruit growing upon long foot-stalks. *Quercus cum longo pediculo*. C. B. P. 429. Oak with long foot-stalks to the Acorn.
3. **QUERCUS (Sempervirens)** foliis oblongis sinuatis obtusis perennantibus, pedunculis glandorum longissimis. Oak with oblong, obtuse, indented leaves which are evergreen, having very long foot-stalks to the Acorns. *Quercus latifolia perpetuò virens*. C. B. P. 420. Broad-leaved evergreen Oak.
4. **QUERCUS (Humilis)** foliis oblongis obtusè dentatis, fructibus sessilibus conglomeratis. Dwarf Oak with oblong obtusely indented leaves, and fruit growing in clusters sitting close to the branches. *Quercus humilis* gallis bi-

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nis ternis aut plurimis simul junctis. C. B. P. 420. Dwarf Oak with galls growing together by pairs, by threes, or in larger clusters.

5. **QUERCUS (Cerris)** foliis oblongis lyrato-pinnatifidis, laciniis transversis acutis, subtus subtomentosis. Lin. Sp. Plant. 997. Oak with oblong leaves which are lyre-shaped, wing-pointed, and have transverse acute jags which are downy on their under side. *Quercus calyce hispido, glande minore*. C. B. P. 420. Oak with prickly cups and smaller Acorns.
6. **QUERCUS (Esculus)** foliis pinnato-sinuatis lævibus fructibus sessilibus. Prod. Leyd. 80. Oak with smooth wing-indented leaves, and fruit sitting close to the branches. *Quercus parva* five *Phagus Græcorum* & *Esculus Plinii*. C. B. P. The small Oak or Phagus of the Greeks, and the *Esculus* of Pliny, commonly called the cut-leaved Italian Oak.
7. **QUERCUS (Ægilops)** foliis ovato-oblongis glabris, ferrato dentatis. Lin. Sp. Plant. 1414. Oak with oblong, oval, smooth, sawed, indented leaves. *Quercus calyce echinato, glande majore*. C. B. P. 420. Oak with a prickly cup and a larger Acorn.
8. **QUERCUS (Rubra)** foliis obtusè-sinuatis setaceo-mucronatis. Lin. Sp. Plant. 996. Oak with obtuse sinuated leaves, terminated by bristly points. *Quercus Esculi divisurâ, foliis amplioribus aculeatis*. Pluk. Alm. 309. tab. 54. fig. 4. Oak with broad spiny leaves, which are divided like the *Esculus*.
9. **QUERCUS (Prinus)** foliis obovatis utrinque acumina-tis sinuato-ferratis, denticulis rotundatis uniformibus. Hort. Cliff. 448. Oak with oblong oval leaves which are pointed on both sides, and have sawed sinuses, with uniform roundish indentures. *Quercus castaneæ foliis pro-cera arbor Virginiana*. Pluk. Alm. 309. The American Chestnut-leaved Oak.
10. **QUERCUS (Nigra)** foliis cuneiformibus obsoletè trilobis. Flor. Virg. 117. Oak with wedge-shaped leaves, having three worn-out lobes. *Quercus folio non ferrato in summitate quasi triangulo*. Catesb. Car. 1. p. 20. The Black Oak.
11. **QUERCUS (Alba)** foliis obliquè pinnatifidis, sinu-bus angulisque obtusis. Lin. Sp. Plant. 996. Oak with oblique many-pointed leaves, having obtuse sinuses and angles. *Quercus alba Virginiana*. Catesb. Car. 1. p. 21. tab. 21. The white Oak of Virginia.
12. **QUERCUS (Phellos)** foliis lanceolatis integerrimis glabris. Flor. Virg. 149. Oak with spear-shaped, entire, smooth leaves. *Quercus foliis oblongis non sinuatis*. Catesb. Car. 1. p. 17. The Willow-leaved Oak.
13. **QUERCUS (Ilex)** foliis oblongo-ovatis subtus tomento-sis integerrimis. Prod. Leyd. 81. Oak with oblong, oval, entire leaves, which are downy on their under side. *Ilex folio*

folio angusto non ferrato. C. B. P. 424. *The narrow-leaved evergreen Oak.*

14. QUERCUS (*Gramuntia*) foliis oblongo-ovatis sinuato-spinosis subtus tomentosis, glandibus pedunculatis. Sauv. Monsp. 96. *Evergreen Oak with oblong, oval, prickly, indented leaves, which are woolly on their under side, and bears Acorns with foot-stalks.* Ilex folio agrifolii. Bot. Monsp. 140. *The Holly-leaved evergreen Oak.*

15. QUERCUS (*Coccifera*) foliis ovatis indivisis, spinoso-dentatis glabris. Prod. Leyd. 80. *Oak with oval, undivided, smooth leaves, which are prickly and indented.* Ilex aculeata, cocciglandifera. C. B. P. 425. *Prickly Kermes Oak.*

16. QUERCUS (*Virginiana*) foliis lanceolato-ovatis integerrimis petiolatis sempervirentibus. *Oak with spear-shaped, oval, entire leaves, which are evergreen, and have foot-stalks.* Quercus sempervirens foliis oblongis non sinuatis. Banist. *Evergreen Oak with oblong leaves which are not sinuated, commonly called Live Oak in America.*

17. QUERCUS (*Suber*) foliis ovato-oblongis indivisis serratis subtus tomentosis, cortice rimoso fungoso. Hort. Cliff. 448. *Oak with oval, oblong, undivided leaves, which are sawed and woolly on their under side, and have a fungous cleft bark.* Suber latifolium perpetuo virens. C. B. P. 424. *The broad-leaved evergreen Cork-tree.*

The first sort here mentioned, is the most common Oak of this country, which is so well known as to need no description; the leaves of this have pretty long foot-stalks, and the Acorns have none, but sit close to the branches.

The second sort is not so common here as the first, but in the wilds of Kent and Suffex I have seen many large trees of this kind. The leaves of this are not so deeply sinuated as those of the first, nor are they so irregular, but the indentures are opposite, like the lobes of winged leaves; these have scarce any foot-stalks, but sit close to the branches; the Acorns stand upon very long foot-stalks, in which they differ from the common sort. The timber of this sort is accounted better than that of the first, and the trees when growing have a better appearance. These have been generally supposed to be feminal varieties, which have accidentally come from Acorns of the same trees; I was long of this opinion myself, but having lately seen some young trees with Acorns upon them, which were raised from Acorns of the second sort, and finding they retain their difference, I am inclined to believe they are different.

The third sort grows upon the Apennines, and also in Swabia and Portugal. The leaves of this are broader, and not so deeply sinuated as those of the common Oak; they are of a lighter green on their upper side, and pale on their under; they have very short foot-stalks, and their points are obtuse; the Acorns have very long foot-stalks, which frequently sustain three or four growing in a cluster.

The fourth sort grows in the south of France and Italy; this is a low bushy Oak, which rises but six or seven feet high, sending out many slender branches the whole length, garnished with oblong leaves which are obtusely indented; they are about three inches long, and one and a half broad, standing upon slender foot-stalks; the Acorns are small and grow in clusters, and the galls grow three or four together.

The fifth sort grows in Burgundy; the leaves of this are oblong and pointed, and are frequently indented in the middle like a lyre; they are jagged and acute-pointed, a little hoary on their under side, standing upon slender foot-stalks. The Acorns are small, and have rough prickly cups.

The sixth sort grows naturally in Spain and Italy; the leaves of this tree are smooth, and deeply sinuated like winged leaves; some of the sinuses are obtuse, and others end in acute points; they have very short foot-stalks; the branches are covered with a purplish bark when young; the Acorns are long and slender, the cups rough and a little prickly, sitting close to the branches. The Acorns of this sort are sweet, and are

frequently eaten by the poor in the south of France, who in times of scarcity grind them and make bread with the flour.

The seventh sort grows naturally in the Levant, from whence the Acorns are annually brought to Europe, where they are used for dyeing; these are called Velani, and the tree Velanida by the Greeks. It is one of the fairest species of Oak in the world: the trunk of this rises as high as the common Oak; the branches extend very wide on every side, and are covered with a grayish bark, intermixed with brown spots; the branches are closely garnished with oblong oval leaves, about three inches long, and almost two broad, which are deeply sawed on their edges; most of the saws or teeth turn backward, and terminate in acute points. The leaves are stiff, of a pale green on their upper side, and downy on their under; the Acorns have very large scaly cups which almost cover them; the scales are ligneous and acute-pointed, standing out a quarter of an inch; some of the cups are as large as middling Apples.

The eighth sort grows naturally in Virginia, and in other parts of North America. This arrives to a large size in the countries where it naturally grows; the bark is smooth, of a grayish colour, but that of the younger branches is darker; the leaves are six inches long, and two and a half broad in the middle, where they are broadest; they are obtusely sinuated, each sinus ending with a bristly point, of a bright green, standing upon short foot-stalks. The leaves continue their verdure very late in autumn, so that unless hard frost comes on early, they do not fall till near Christmas, and they do not change their colour long before. The Acorns of this sort are a little longer, but not so thick as those of the common Oak.

The ninth sort grows naturally in North America; of this there seems to be two kinds, one of which grows to a much larger size than the other, though this may be occasioned by the soil in which they grow; for the largest sort grows in the rich low lands, where it becomes the largest tree of any of the Oaks in those countries. The wood is not of a fine grain, but is very serviceable; the bark is gray and scaly; the leaves are five or six inches long, and two inches and a half broad in the middle, indented on the edges, and have many transverse veins running from the midrib to the borders; they are of a bright green, and so nearly resemble those of the Chestnut-tree, as scarcely to be distinguished from it. The Acorns of this sort are very large, and their cups are short. The leaves of the other variety are not so large, nor so strongly veined, and the Acorns are smaller and a little longer, which may arise from the soil.

The tenth sort grows naturally on poor land in most parts of North America, where it never grows to a large size, and the wood is of little value. The bark is of a dark brown colour; the leaves are very broad at the top, where they have two waved indentures, which divide them almost into three lobes; they diminish gradually to their base, where they are narrow; they are smooth, of a lucid green, and have short foot-stalks. The Acorns are smaller than those of the common Oak, and have short cups.

The eleventh sort grows naturally in North America, where the wood is esteemed preferable to any of their other sorts for building, being much more durable than any of them. The bark of this tree is grayish; the leaves are of a light green six or seven inches long, and four broad in the middle; they are regularly indented almost to the midrib; the indentures are obtuse, and have short foot-stalks. The Acorns of this greatly resemble those of the common Oak.

The twelfth sort grows naturally in North America, where they distinguish two sorts; one of them is called the Highland Willow Oak, which grows upon poor dry land; the leaves are of a pale green and entire, shaped like those of the Willow-tree. The Acorns are very small, but have pretty large cups.

The other grows in low moist land, and rises to a much greater height; the leaves are longer and narrower,

rower, and the Acorns are of the same size and shape, so that I suspect their difference is owing to the soil in which they grow.

The thirteenth sort is generally known by the title of Ilex, or evergreen Oak; of this there are several varieties, which differ greatly in the size and shape of their leaves; but these will all arise from Acorns of the same tree, as I have several times experienced; nay, the lower and upper branches of the same tree are frequently garnished with leaves, very different in size and shape from each other; those on the lower branches being much broader, rounder, and their edges indented and set with prickles, but those on the upper are long, narrow, and entire; so that I verily believe they are all but one species, except the Kermes Oak, which is undoubtedly a distinct sort. The leaves of the Ilex are from three to four inches long, and one broad near the base, gradually lessening to a point; they are of a lucid green on their upper side, but whitish and downy on their under, and are entire, standing upon pretty long foot-stalks; these remain green all the year, and do not fall till they are thrust off by young leaves in the spring. The Acorns are smaller than those of the common Oak, but of the same shape.

The fourteenth sort is supposed to be a different species, but of this I much doubt, having raised some plants from the Acorns of the thirteenth, whose leaves are so like those of this, as not to be distinguished from them; these are shorter and broader than the other, and approach in shape to those of the Holly-tree, and are also set with prickles on their edges.

The fifteenth sort is the Oak, from which the kermes, or what is called scarlet grain is collected, which is an insect that harbours on this tree. It grows naturally in Provence and Languedoc, where it is known by the title d'Avaux. This is of small growth, seldom rising above twelve or fourteen feet high, sending out branches on every side the whole length, so as to form a bushy shrub; the leaves are oval and undivided; they are smooth on their surface, but indented on their edges, which are armed with prickles like those of the Holly-tree. The Acorns are smaller than those of the common Oak.

The sixteenth sort grows naturally in Carolina and Virginia, where it rises to the height of forty feet. The grain of the wood is hard, tough, and coarse; the bark is grayish; the leaves are ovally spear-shaped, about three inches long and one and a half broad, entire, and of a dark green, standing upon short foot-stalks; they are of a thick consistence, and continue green all the year. The Acorns are small, oblong, and have short cups; they are very sweet, so are eaten by the Indians, who lay them up in store for the winter; they also draw a very sweet oil from them, little inferior to that of sweet Almonds. This is called the Live Oak in America.

The seventeenth sort is the tree whose bark is the cork; of this there are two or three varieties, viz. one with a broad, another with a narrow leaf, which are evergreen; and there is one or two which cast their leaves in autumn, but the broad-leaved evergreen is the most common; the other may probably be only varieties arising by accident. The leaves of this are entire, of an oblong oval, about two inches long, and one and a quarter broad, sawed on their edges, and have a little down on their under sides; their foot-stalks are very short; these leaves continue green through the winter till the middle of May, when they generally fall off just before the new leaves come out, so that the trees are very often almost bare for a short time. The Acorns are very like those of the common Oak.

The exterior bark of this tree is the cork; this is taken off from the trees every eight or ten years, but there is an interior bark which nourishes the trees, so that the stripping off the outer is so far from injuring them, that it is necessary to continue the trees; for those whose bark are not taken off, seldom last longer than fifty or sixty years in health; whereas the trees

which are barked every eight or ten years, will live a hundred and fifty years and more. The bark of the young tree is porous and good for little, however it is necessary to take it off when the trees are twelve or fifteen years old, without which the bark will not be good, and after eight or ten years, the bark will be fit to take off again; but this second peeling is of little use, but the third peeling the bark will be in perfection, and will continue so many years, for the best cork is taken from the old trees. The time of year for stripping off this bark is in July, when the second sap flows plentifully; this is performed with an instrument, like that used for disbarking Oaks. The ashes of burnt cork mixed with fresh butter, and made into an ointment, is much recommended for the piles.

All the sorts of Oaks are propagated by sowing their Acorns, and the sooner they are put into the ground after they are ripe, the better they will succeed; for they are very apt to sprout where they are spread thin, and if they are laid in heaps, they ferment and rot in a little time; therefore the best season for sowing them is in the beginning of November, by which time they will be fallen from the trees.

I shall first give some directions for raising the several sorts of Oaks in a nursery, which are intended to be planted out for ornament, where their timber is not to be regarded. These Acorns may be sown in beds about four feet wide, with paths of two feet broad between them; in these beds there may be four rows sown, at about nine inches distance from each other; when the beds are marked out, there should be drills drawn with a hoe in a strait line, into which the Acorns should be dropped at about two or three inches distance; then they must be carefully covered over with the earth two inches thick, leaving none of them uncovered, which might tempt the vermin, for if they once find them out, they will make sad havock of the Acorns.

In the spring, when the plants begin to appear, you must carefully clear them from weeds; and if the season proves dry, you should refresh them now and then with a little water, which will greatly promote their growth. In these beds the plants should remain until the following autumn (observing constantly to keep them clear from weeds;) at which time you should prepare a spot of good fresh earth (in size proportionable to the quantity of plants,) which should be well trenched and levelled; then toward the middle or latter end of October, you should carefully take up the plants, so as not to injure their roots, and plant them out in rows three feet asunder, and eighteen inches distance plant from plant; observing never to suffer the plants to abide long out of the ground, because their roots would dry and endanger their growth.

When the plants have taken root in this nursery, they will require little more care than to keep them clear from weeds, and dig the ground between the rows every spring; in doing of which, you should cut off such roots as extend very far from the trunk of the trees, which will render them better for transplanting again; you should also prune off such side-branches as extend themselves very far, and would retard the upright shoot; but you should by no means cut off all the small lateral branches, some of which are absolutely necessary to be left on, to detain the sap for the augmentation of the trunk; for I have often observed, where trees have been thus closely pruned, that their heads have overgrown their bodies, so that they have bent downward and become crooked.

When these trees have remained in the nursery three or four years, they will then be large enough to transplant to the places where they are to remain; for it is not proper to let them grow very large before they are planted out, because these are very hazardous trees to remove when old, or after they have taken deep root.

The season for this work is (as I said before) in the autumn; at which time, if they are carefully taken up, there will be little danger of their succeeding. In transplanting these trees, you should by no means cut their heads, which is too much practised; all that should be done, must be only to cut off any bruised or ill-placed branches, which should be taken off close to the place where they are produced; but there can be no greater injury done to these trees, than to shorten their shoots; for when the leading bud (which is absolutely necessary to draw and attract the nourishment) is taken off, the branch often decays entirely, or at least down to the next vigorous bud.

The trees thus raised and managed, will, (if planted in a proper soil) grow to a considerable magnitude, and are very proper for a wilderness in large gardens, or to plant in clumps in parks, &c. but if they are designed for timber, it is much the better method to sow the Acorns in the places where they are to remain; in order to which, you should provide yourself in autumn with a sufficient quantity of Acorns, which should be always taken from strait, upright, vigorous growing trees; these should be gathered from under the trees as soon as may be after they are fallen; and, if possible, in a dry time, laid thin in some open room to dry; after which they may be put into dry sand, and preserved in a dry place until the beginning of November, when you should prepare the ground for planting them.

The directions before given are designed only for small plantations in a garden or park, which are only for pleasure; but where these trees are cultivated with a view to profit, the Acorns should be sown where the trees are designed to grow; for those which are transplanted will never grow to the size of those which stand where they are sown, nor will they last near so long sound. For in some places, where these trees have been transplanted with the greatest care, and they have grown very fast for several years after, yet they are now decaying, when those which remain in the place where they came up from the Acorns, are still very thriving, and have not the least sign of decay. Therefore, whoever designs to cultivate these trees for timber, should never think of transplanting them, but sow the Acorns on the same ground where they are to grow; for the timber of all those trees which are transplanted, is not near so valuable as that of the trees from Acorns. I shall therefore add some plain directions for sowing Acorns, and managing young trees during their minority, until they are out of danger, and require no farther care.

The first thing to be done is, that of fencing the ground very well, to keep out cattle, hares, and rabbits; for if either of these can get into the ground, they will soon destroy all the young trees. Indeed they will in a few years grow to be out of danger from hares and rabbits, but it will be many years before they will be past injury from cattle, if they are permitted to get into the plantation, therefore durable fences should be put round the ground: if in the beginning a pale fence is made about the land, which may be close at the bottom and open above, and within the pale a Quick-hedge planted, this will become a good fence by the time the pale decays, against all sorts of cattle; and then the trees will have got above the reach of hares and rabbits, so that they cannot injure them, for the bark of the trees will be too hard for them to gnaw.

After the ground is well fenced, it should be prepared, by ploughing it three or four times, and after each ploughing to harrow it well, to break the clods, and cleanse the ground from Couch, and the roots of all bad weeds. Indeed if the ground is green sward, it will be better to have one crop of Beans, Peas, or Turneps off the ground, before the Acorns are sown, provided these crops are well hoed to stir the surface and destroy the weeds; for if this is observed, the crop will mend and improve the land for sowing; but in this case the ground should be ploughed as soon as possible, when the crop is taken off, to prepare it

for the Acorns, which should be sown as soon as may be after the Acorns are ripe; for although these may be preserved in sand for some time, yet they will be apt to sprout; and if so, the shoots are in danger of being broken and spoiled; therefore I should advise sowing early, which is certainly the best method.

In making choice of the Acorns, all those should be preferred, which are taken from the largest and most thriving trees; and those of pollard-trees should always be rejected, though the latter are generally the most productive of Acorns, but those of the large trees commonly produce the strongest and most thriving plants.

The season for sowing the Acorns being come, and the ground having been ploughed and levelled smooth, the next work is to sow the Acorns, which must be done by drawing drills across the ground, at about four feet asunder, and two inches deep, into which the Acorns should be scattered at two inches distance. These drills may be drawn either with a drill plough, or by hand with a hoe; but the former is the most expeditious method, therefore in large plantations should be preferred. In drawing the drills, if the land has any slope to one side, these should be made the same way as the ground slopes, that there may be no stoppage of the wet by the rows of plants crossing the hanging of the land. This should be particularly observed in all wet ground, or where the wet is subject to lie in winter, but in dry land it is not of much consequence. When the Acorns are sown, the drills should be carefully filled in, so as to cover the Acorns securely; for if any of them are exposed, they will entice the birds and mice; and if either of these once attack them, they will make great havock with them.

The reason of my directing the drills to be made at this distance, is for the more convenient stirring the ground between the rows, to keep the young plants clear from weeds; for if this is not carefully done, it cannot be expected that the young plants should make much progress; and yet this is generally neglected by many who pretend to be great planters, who are often at a large expence to plant, but seldom regard them after; so that the young plants have the difficulty to encounter the weeds, which are frequently four or five times the height of the plants, and not only shade and draw them, but also exhaust all the goodness of the ground, and consequently starve the plants. Therefore, whoever hopes to have success in their plantations, should determine to be at the expence of keeping them clean for eight or ten years after sowing, by which time the plants will have obtained strength enough to keep down the weeds; the neglecting of this has occasioned so many plantations to miscarry, as are frequently to be met with in divers parts of England.

About the middle of April the young plants will appear above ground; but before this, if the ground should produce many young weeds, it will be good husbandry to scuffle the surface over with Dutch hoes, in a dry time, either the latter end of March or the beginning of April, to destroy the weeds, whereby the ground will be kept clean until all the plants are come up so as to be plainly discerned; by which time it may be proper to hoe the ground over again, for by doing it early, while the weeds are small, a man will perform more of this work in one day than he can in three or four when the weeds are grown large; besides, there will be great hazard of cutting off or injuring the young plants when they are hid by the weeds; and small weeds being cut, are soon dried up by the sun; but large weeds often take fresh root and grow again, especially if rain should fall soon after, and then the weeds will grow the faster for being stirred; therefore it is not only the best method, but also the cheapest husbandry, to begin cleaning early in the spring, and to repeat it as often as the weeds are produced.

The first summer, while the plants are young, it will be the best way to perform these hoeings by hand, but

but afterward it may be done with the hoe-plough; for as the rows are four feet asunder, there will be room enough for this plough to work; and as this will stir and loosen the ground, it will be of great service to the plants; but there will require a little hand-labour where the plough is used, in order to destroy the weeds, which will come up in the rows between the plants; for these will be out of the reach of the plough, and if they are not destroyed, they will soon overgrow and bear down the young plants.

After the plants have grown two years, it will be proper to draw out some of them, where they grow too close; but in the doing of this, great care should be had not to injure the roots of those left; for as the plants which are drawn out are only fit for plantations designed for pleasure, so these should not be so much regarded in their being removed, as to sacrifice any of those which are designed to remain. In the thinning of these plantations, the plants may at the first time be left about one foot asunder, which will give them room enough to grow two or three years longer, by which time it may be easy to judge which are likely to make the best trees; therefore these may be then fixed on as standards to remain, though it will be proper to have a greater number at this time marked than can be permitted to grow, because some of them may not answer the expectation; and as it will be improper to thin these trees too much at one time, so leaving double the number intended at the second thinning will not be amiss. Therefore, if they are then left at about four feet distance in the rows, they will have room enough to grow three or four years longer; by which time, if the plants have made good progress, their roots will have spread over the ground, therefore it will be proper to take up every other tree in the rows. But by this I do not mean to be exact in the removing, but to make choice of the best plants to stand, which ever rows they may be in, or if they should not be exactly at the distance here assigned; all that is designed here, is to lay down general rules, which should be as nearly complied with as the plants will permit; therefore, every person should be guided by the growth of the trees in the performance of this work.

When the plants have been reduced to the distance of about eight feet, they will not require any more thinning. But in two or three years time, those which are not to remain will be fit to cut down, to make stools for under-wood; and those which are to remain, will have made such progress as to become a shelter to each other; for this is what should be principally attended to, whenever the trees are thinned; therefore in all such places as are much exposed to the wind, the trees should be thinned with great caution and by slow degrees; for if the air is let too much at once into the plantation, it will give a sudden check to the trees, and greatly retard their growth; but in sheltered situations, there need not be so great caution used as in those places, for the plants will not be in so much danger of suffering.

The distance which I should chuse to allow to those trees which are designed to remain for timber is, from twenty-five to about thirty feet, which will not be too near, where the trees thrive well; in which case their heads will spread, so as to meet in about thirty or thirty-five years; nor will this distance be too great, so as to impede the upright growth of the trees. This distance is intended, that the trees should enjoy the whole benefit of the soil; therefore, after one crop of the under-wood, or at the most two crops are cut, I would advise the stubbing up the stools, that the ground may be entirely clear, for the advantage of the growing timber, which is what should be principally regarded; but in general, most people have more regard for the immediate profit of the under-wood than the future good of the timber, and frequently by so doing spoil both; for if the under-wood is left after the trees have spread so far as that their heads meet, the under-wood will not be of

much worth; and yet, by their stools being left, they will draw away a great share of nourishment from the timber-trees, and retard them in their progress.

The soil in which the Oak makes the greatest progress, is a deep rich loam, in which the trees grow to the largest size; and the timber of those trees which grow upon this land, is generally more pliable than that which grows on a shallower or drier ground, but the wood of the latter is much more compact and hard. Indeed there are few soils in England, in which the Oak will not grow, provided there is proper care taken in their cultivation, though this tree will not thrive equally in all soils; but yet it might be cultivated to a national advantage upon many large wastes in several parts of England, as also to the great profit of the estates where these tracts of land now lie uncultivated, and produce nothing to the owner. And should the present temper of destroying the timber of England continue in practice some years longer, in the same degree which it has for some years past, and as little care taken to raise a supply, this country which has been so long esteemed for its naval strength, may be obliged to seek for timber abroad, or be content with such a naval strength, as the poor remains of some frugal estates may have left growing; for as to the large forests, from whence the navy has been so long supplied, a few years will put an end to the timber there; and how can it be otherwise, when the persons to whose care these are committed, reap an advantage from the destruction of the timber?

Before I quit this subject, I must beg leave to take notice of another great evil, which is of so much consequence to the public, as to deserve their utmost attention; which is, that of cutting down the Oaks in the spring of the year, at the time when the sap is flowing. This is done for the sake of the bark, which will then easily peel off; and for the sake of this, I think, there is a law, whereby people are obliged to cut down their timber at this season. But by so doing, the timber is not half so durable as that which is fallen in the winter, so that those ships, which have been built of this spring-cut timber, have decayed more in seven or eight years, than others which were built with timber cut in winter; have done in twenty or thirty. And this our neighbours the French have experienced, and therefore have wisely ordered, that the bark should be taken off the trees standing, at the proper time, but the trees are left till the next, and sometimes until the second winter, before they are cut down; and the timber of these are found to be more durable and better for use, than that of any trees which have not been peeled. Therefore I wish we were wise enough to copy after them in those things which are for public good, rather than to imitate them in their follies, which has been too much the fashion of late years.

QUICK. By the word Quick is generally understood all live hedges, of whatever sort of plants they are composed, to distinguish them from dead hedges; but, in the more strict sense of this word, it is generally applied to the Hawthorn, or *Mespilus Sylvestris*; under which name the young plants or sets, are commonly sold by the nursery-gardeners, who raise them for sale.

In the choice of these sets, those which are raised in the nursery, are to be preferred to such as are drawn out of the woods, because the latter have seldom good roots; though as they are larger plants than are commonly to be had in the nursery, many people prefer them on that account; but from long experience I have found, that those hedges which have been planted with young plants from the nursery, have always made the best hedges. Indeed, if persons would have patience to wait for these from seed, and to sow the Haws in the place where the hedge is designed, these unremoved plants will make a much stronger and more durable fence, than those which are transplanted; but I am aware that most people will be for condemning this practice, as tedious in raising; but if the Haws are

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are buried one year in the ground, to prepare them for vegetation before they are sown, it will not be so long before this will become a good fence, as is generally imagined. Nay, from some trials of this kind, which I have made, I have found, that those plants which have remained where they came up from seed, have made such progress as to overtake, in six years, plants of two years growth, which were transplanted at the time when these seeds were sown.

And if the hedges are raised from seed, it will not be amiss to mix Holly berries with the Haws; and if so, these berries should also be buried one year, to prepare them, so that then both will come up together the following spring; and this mixture of Holly with the Quick, will not only have a beautiful appearance in the winter, but will also thicken the hedge at the bottom, and make it a better fence.

But where the hedge is to be planted, the sets should not be more than three years old from the Haws; for when they are older, their roots will be hard and woody; and as they are commonly trimmed off before the sets are planted, so they very often miscarry; and such of them as do live, will not make so good progress as younger plants, nor are they so durable; for these plants will not bear transplanting so well as many others, especially when they have stood long in the seed-bed unremoved.

The method of planting, as also of plashing and pruning of these hedges, having been fully explained under the article of HEDGES, I shall not repeat that here, but shall only beg leave to add the method which is prescribed by Thomas Franklin, Esq; which he had long practised in planting of these hedges, which is as follows:

He first set out the ground for ditches and Quick ten feet in breadth; he subdivided that, by marking out two feet and a half on each side (more or less at pleasure) for the ditches, leaving five in the middle between them; then digging up two feet in the midst of those five feet, he planted the sets in; which although it required more labour and charge, he says, he soon found it repaid the cost. This done he began to dig the fosses, and to set up one row of turfs on the outside of the said five feet; namely, one row on each side thereof, the green side outmost, a little reclining, so as the Grass might grow.

After this, returning to the place he began at, he ordered one of the men to dig a spit of the under-turf mould, and lay it between the turfs placed edgewise, as before described, upon the two feet, which was purposely dug in the middle, and prepared for the sets, which the planter set with two Quicks upon the surface of the earth almost upright, whilst another workman laid the mould forwards about twelve inches, and then set two more, and so continued.

This being finished, he ordered another row of turfs to be placed on each side upon the top of the former, and filled the vacancy between the sets and turfs as high as their tops; always leaving the middle, where the sets were planted, hollow, and somewhat lower than the sides of the banks by eight or ten inches, that the rain may descend to their roots; which is of great advantage to their growth, and by far better than by the old method, where the banks are made too much sloping; and the roots of the sets are seldom wetted, even in a moist season, the summer following; but if it prove dry, many of the sets, especially the late planted, will perish; and even few of those that had been planted in the beginning of April (the summer happening to be somewhat dry) escaped.

The planting being thus advanced, the next care is fencing, by setting a hedge of about twenty inches high upon the top of the bank on each side thereof, leaning a little outwards from the sets, which will protect them as well (if not better) than a hedge of three feet or more, standing on the surface of the ground; for as these are raised with the turfs and fods about twenty inches, and the hedge about twenty

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inches more, it will make three feet four inches, so as no cattle can approach the dead hedge to prejudice it, unless they set their feet in the ditch itself, which will be at least a foot and a half deep; and from the bottom of the foss to the top of the hedge, about four feet and a half, which they can hardly reach over to crop the Quick, as they might in the old way; and besides, such a dead hedge will endure a year longer.

He says, he had a hedge which had stood five years; and though nine or ten feet were sufficient for both ditches and banks, yet where the ground is but indifferent, it is better husbandry to take twelve feet, which will allow of a bank at least six feet broad, and gives more scope to place the dead hedges farther from the sets, and the ditches being shallow, will in two years time graze.

As to the objection, that taking twelve feet wastes too much ground, he affirms, that if twelve feet in breadth be taken for a ditch and bank, there will no more ground be wasted than by the common way; for in that a Quick is rarely set, but there are nine feet between the dead hedges, which is entirely lost all the time of fencing; whereas with double ditches, there remain at least eighteen inches on each side where the turfs were set on edge, that bear more Grass than when it lay on the flat.

But, admitting it did totally lay waste three feet of ground, the damage would be very inconsiderable; since forty perches, in length, two hundred and twenty yards will make perches 7, 25", 9', or 7 poles $\frac{1}{2}$; which at 13s. and 4d. the acre, amounts not to 7d. $\frac{1}{2}$ per annum.

Now that this is not only the best, but cheapest way of Quick-setting, will appear by comparing the charge of both.

In the usual way, the charge of a three feet ditch is 4d. per pole, the owner providing sets; if the workman finds them, he will have for making the said ditch and setting them, 8d. per pole; and for hedging, 2d. that is, for both sides, 4d. the pole; which renders the charge of hedging, ditching, and sets, 12d. the pole; that is, for forty rods in length 40s.

Then one load of wood out of the copse costs (with the carriage, though but two or three miles distance) 10s. which will seldom hedge above eight poles (single hedge;) but allowing to do ten, to fence forty poles, there must be at least eight loads of wood, which costs 4l. making the whole expence for ditching, fencing, and setting forty poles, to be 6l. reckoning with the least; for scarce any will undertake to do it for less than 3s. 6d. per pole, and then the forty poles cost 7l.

Whereas with double ditches, both of them, with the plants included, will be done for 8d. the pole, and the husbandman get as good wages as with the single ditch (for though the labour about them is more, yet the making the table is saved,) which costs 1l. 6s. 8d. and the hedges being low, they will make better wages at hedging for a penny a pole, than at 2d. for common hedges, which comes to 6s. 8d. for hedging forty poles on both sides. Thus one load of wood will fence thirty poles at least, and forty hedged with two thirds of wood less than in the other way, and cost but 1l. 6s. 8d. which makes the other whole charge of sets, ditching, fencing, and wood, but 3l.

QUICK-BEAM. See *SORBUS SYLVESTRIS*.

QUINCE-TREE. See *CYDONIA*.

QUINCUNX ORDER is a plantation of trees, disposed originally in a square, consisting of five trees, one at each corner, and a fifth in the middle, which disposition, repeated again and again, forms a regular grove, wood, or wilderness, and, when viewed by an angle of the square or parallelogram, presents equal or parallel alleys.

Or, the Quincunx is the figure of a plantation of trees disposed in several rows, both length and

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breadthwise, in such manner, that the first tree of the second row commences in the centre of the square formed by the two first trees of the first row, and the two first of the third, resembling the figure of the five at cards. This regular disposition of trees was formerly more regarded than at present, and is still much in practice in France for planting trees to form a grove.

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Trees planted in Quincunx are such as are planted in the following form :



QUINQUEFOLIUM. See POTENTILLA.

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RACEMIFEROUS signifies bearing in clusters.

RACEMUS, a cluster, is a stalk divided or branched into several foot-stalks, sustaining the flowers or fruit set together, as are the bunches of Grapes, Currants, &c. The first of these conditions distinguishes it from a spike, the last from a panicle.

RADIATED FLOWERS are such as have several semiflorets set round a disk in form of a radiant star, as are the flowers of Daisy, Cammomile, &c. These are called radiated discous flowers; those which have no such ray, are called naked discous flowers, as the Wormwood, Mugwort, Tansey, &c.

RADICLE denotes that part of the seed of a plant, which, upon its vegetation, becomes a little root, by which the tender plant at first receives its nourishment before the after-root be formed. This is that part of the seed, which, in making malt, shoots forth, and is called the come or comb.

RADISH. See RAPHANUS.

RADISH (HORSE.) See COCHLEARIA.

RAIN is generally accounted to be a crude vapour of the earth, but more especially of the sea, drawn up from thence by the attractive power of the sun, or carried thitherward by pulsion, and wafted by the winds into the aerial region, by which sublimation and rarefaction, and the virtual qualities of the sun and air, it is formed into clouds.

The crudities are dispelled, and these clouds suspend and hang in the air, and though it may be thought impossible that they should be so suspended in the air by reason of their great weight and pressure, yet it will not appear so on consideration.

When these vapours are thus drawn up to any considerable height by the strength of the air which is underneath them, and which still grows greater and greater, and by its motion, undulating this way and that way, they rise gradually through the air.

This is demonstrable by paper kites, which, after they are raised to about sixty feet high, rise easier and with greater swiftness, and the higher, still the better and stronger they fly.

These vapours, being thus arrived into the upper regions of the air, are soon aggregated and condensed into bodies and clouds.

And though they are blown here and there, they are still suspended, till they are released from their imprisonment by the genial disposition of the sun, or by the natural warmth, humidity and rarefaction of the air.

It is not to be doubted, but that the Rain drops out

of the clouds, because we do not find it rain, but where clouds are to be seen, and by how much the fairer the weather is, the seldomer it rains.

Rain is a very frequent and useful meteor, descending from above in form of drops of water.

Rain seems to differ from dew only in this, that dew falls at some particular times, and in very small drops, so as to be seen when it is down, but is scarce perceivable while it is falling; whereas Rain is grosser, and falls at any time.

Rain is apparently a precipitated cloud, as clouds are nothing but vapours raised from moisture, waters, &c. and vapours are demonstratively nothing else but little bubbles, or vesiculæ detached from the waters by the power of the solar or subterraneous heat, or both.

These vesiculæ, being specifically lighter than the atmosphere, are buoyed up thereby till they arrive at a region where the air is a just balance with them; and here they float, till by some new agent they are converted into clouds, and thence into either Rain, snow, hail, mist, or the like.

But the agent in this formation of clouds, &c. is a little controverted: the generality will have it the cold, which, constantly occupying the superior regions of the air, chills and condenses the vesiculæ at their arrival from a warmer quarter, congregates them together, and occasions several of them to coalesce into little masses; by this means their quantity of matter increasing in a greater proportion than their surface, they become an overload to the lighter air, and descend into Rain.

The coldness of the air may cause the particles of the clouds to lose their motions, and become less able to resist the gravity of the incumbent air, and consequently to yield to its pressure, and fall to the ground.

The wind may collect the vapours in such abundance, as first to form very thick clouds, and then to squeeze those clouds together, till the watery particles make drops too big to hang in the air.

But the grand cause, according to Mons. Rohault, is still behind; he conceives it to be the heat of the air, which, after continuing for some time near the earth, is at length carried up on high by a wind, and, there thawing the frozen villi or flocks of the half-frozen vesiculæ, reduces them into drops, which, coalescing, descend, and have their dissolution perfected in their progress through the lower and warmer stages of the atmosphere.

Monsieur Le Clerc and others ascribe this descent of the clouds rather to an alteration of the atmosphere than of the vesiculæ, and suppose it to proceed from

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from a diminution of the spring, or elastic force of the air.

This elasticity, which depends chiefly or wholly upon the dry terrene exhalations, being weakened, the atmosphere sinks under its burden, and the clouds fall upon the common principle of precipitation.

Now the little vesiculæ, by any or all of these means being once upon the descent, will persist therein, notwithstanding the increase of resistance they every moment meet withal in their progress through still denser and denser parts of the atmosphere.

For as they all tend towards the same point, viz. the center of the earth; the farther they fall, the more coalitions will they make; and the more coalitions, the more matter there will be under the same surface, the surface not only increasing as the squares, but the solidity as the cubes; and the more matter under the same surface, the less friction or resistance there will be to the same matter.

Thus, if the cold, the wind, &c. happen to act early enough to precipitate the vesiculæ, ere they are arrived to any considerable height, the coalitions being few in so short a descent, the drops will be proportionably small, and thus is formed what we call dew.

If the vapours prove more copious, and rise a little higher, we have a mist or fog.

A little higher still, and they produce a small Rain.

If they neither meet with cold or wind enough to condense or dissipate them, they form a heavy, thick, dark sky, which last sometimes several days or weeks.

Hence we may account for many of the phenomena of the weather, e. g. Why a cold is always a wet summer, and a warm a dry one, because the principle of precipitation is had in the one case, and wanting in the other:

Why we have ordinarily most Rain about the equinoxes, because the vapours arise more plentifully than ordinary in the spring, as the earth becomes loosened from the brumal constipations, and because, as the sun recedes from us in autumn, the cold increasing, the vapours that had lingered above, during the summer heats, are now dispatched down.

Why a settled, thick, close sky seldom ever rains, till it has been first cleared, because the equally confused vapours must first be condensed and congregated into separate clouds to lay the foundation of Rain, by which means the rest of the face of the heaven is left open, and pervious to the rays of the sun, &c.

Monf. Le Clerc observes, that all winds do not produce Rains, but only such as collect a great quantity of vapours. Thus in Holland west winds are rainy, because they come from the ocean, and blow up the vapours; east winds blow clear, because they come over vast tracts of land; north winds are rainy, because they come from the north sea, but not so rainy as the west, because the cold north doth not yield such a quantity of vapours as the kinder climate of the Britannie ocean; south winds bring Rain too, for that they, consisting of vapours raised by the heat of the sun in a hot quarter, and so being elevated above others in the air, seem to lie upon our clouds, and press them down towards the earth.

Again: Rain may be produced after this manner. If the vapours rise in so great abundance as to reach and

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mingle with the clouds above them, then they cause Rain in very large drops, and this may happen in still sultry weather, for then the clouds, which are over our heads, have no sensible motion, and in the mean time the heat fills the air with vapours, which, joining with the clouds, and so being stopped in their progress, open a passage for the stores in the clouds to descend upon the earth.

Sometimes also the warm wind thaws the clouds into drops, as we see snow dissolved by heat; now by how much the thicker and sooner any such cloud was gathered, the larger are the drops that come from it, because a greater store of vapours was condensed there. From thence it is, that in summer time we have sudden showers of Rain in very large drops.

It ought also to be remembered, that in those countries which lie between the tropics, where they have the sun vertical, the Rain pours down for several weeks together more like pailfuls than drops. And it is very probable that this is the cause; viz. because at that time the sun draws up abundance of vapours, and rarefies them extremely, so that they are elevated as high as possible, and then are precipitated at once, being too copious and heavy to hang in the air; and besides, there may sometimes be a concurrence of neighbouring vapours, which will be ready to crowd into that part of the air, which is most rarefied by the heat of the sun meeting with the vapours, which are raised in that place, and produce very great clouds and Rain.

If any ask, How the drops of falling water come to be round, as in Rain? it is answered, That this does not happen by any disposition peculiar to the water, but because the drops are equally pressed by the air on every side, and thereby forced into a round figure, the resistance of the air being equal every way; but others give other reasons for it.

In Rain there are two distinct properties or species; the one which serves for the dissolution of the salts of the earth, and the other is a terrestrial matter, which it meets with in its sublimation, which may with some propriety be called either salt or nitre, and both these are useful in the business of vegetation.

Rain is operative in dissolving the salts that are in the earth, and cools and bathes the cortex or skin of all vegetables, and, by a sort of relaxation, causes the sap to pass up more freely, and by that means to grow, and shoot the better.

These foggy humid vapours arising out of the ground, &c. of which Rain is formed, would inevitably stagnate and poison the whole face of the earth, were they not sublimated by the air, and drawn up by the assistance of the sun into the upper regions, but, being there rarefied, they are made of second use in vegetation.

As to the quantity of Rain that falls, its proportion in several places at the same time, and in the same place at several times, we have store of observations, journals, &c. in the Memoires of the French Academy, the Philosophical Transactions, &c. an idea of which take as follows:

Upon measuring then, the Rain falling yearly, its depth, at a medium, is found as in the following table:

Proportion

Proportion of RAIN falling yearly, and its proportion in several places.							
At Townly in Lancashire, observed by Mr. Townly				-	-	-	42 $\frac{1}{2}$ Inches
Upminster in Essex, by Mr. Derham				-	-	-	19 $\frac{1}{4}$
Zurich in Switzerland, by Dr. Sceutcher				-	-	-	32 $\frac{1}{4}$
Pisa in Italy, by Dr. Mich. Angl. Tilli				-	-	-	43 $\frac{1}{4}$
Paris in France, by M. de la Hire				-	-	-	19
Lille in Flanders, by M. de Vaubin				-	-	-	24
Proportions of the RAIN of several years to one another.							
At UPMINSTER.				At P A R I S.			
1700	19	Inches	03 Cent.	21	Inches	38 Cent.	
1701	18		69	27		78	
1702	20		38	15		42	
1703	23		99	18		51	
1704	15		81	21		20	
1705	16		93	14		82	
Proportion of the RAIN of the several seasons to one another.							
1708	Depth at Pisa.	Depth at Upminster	Depth at Zurich.	1708	Depth at Pisa.	Depth at Upminster	Depth at Zurich.
	Inch.	Inch.	Inch.		Inch.	Inch.	Inch.
January	6. 41	2 28	1 64	July	0 00	1 11	3 50
February	3 28	0 46	1 65	August	2 27	2 94	3 15
March	2 65	2 03	1 51	September	7 21	1 46	3 02
April	1 25	0 96	4 69	October	5 33	0 23	2 24
May	3 33	2 02	1 91	November	0 13	0 86	0 62
June	4 90	2 32	5 91	December	0 00	11 97	2 62
Half year	28 82	16 67	17 31	Half year	14 94	8 57	15 35

The Reverend Dr. Hales, in his excellent Treatise of Vegetable Statics, tells us, that the quantity of Rain and dew that falls in a year is, at a medium, 22 inches, and that the quantity of the earth's evaporation in a year is at least $9 + \frac{1}{2}$ inches, since that is the rate at which it evaporates in a summer's day, from which $9 + \frac{1}{2}$ Inches is to be deducted 3. 39 inches, for circulating daily dew, there remains 6. 2 inches, which 6. 2 inches deducted from the quantity of Rain which falls in a year, there remains at least 16 inches depth to replenish the earth with moisture for vegetation, and to supply springs and rivers.

Hence we find that 22 inches depth of Rain in a year is sufficient for all the purposes of nature in such flat countries as is that about Teddington near Hampton-Court; but in the hill countries, as in Lancashire, there falls 42 inches depth of Rain water, from which deducting seven inches for evaporation, there remains 35 inches depth of water, besides great supplies from much more plentiful dews than fall in plain countries.

Which vast stores seem so abundantly sufficient to answer the great quantity of water which is conveyed away by springs and rivers from those hills, that we need not have recourse for supplies to the great abyss, whose surface at high water is surmounted some hundreds of feet by ordinary hills, and some thousands of feet by those vast hills, from whence the longest and greatest rivers take their rise.

RAINBOW, a meteor in form of a particoloured arch or semicircle, exhibited in a rainy sky opposite the sun, by the rarefaction of his rays in the drops of falling rain.

The Rainbow, Sir Isaac Newton observes, never appears but where it rains in the sunshine, and may be represented artificially by contriving water to fall in little drops like rain, through which the sun shining exhibits a bow to the spectator's eye placed between the sun and the drops, especially if a dark body, e. g. a black cloth be disposed beyond the drops.

Anton. de Dominis first accounted for the Rainbow in 1611, he explained at large how it was formed by refraction and reflexion of the sun-beams in spherical drops of water, and confirmed his explication by experiments made with glass globes, &c. full of water, wherein he was followed by Des Cartes, who mended and improved upon his account.

But as they were both in the dark as to the true origin of colours, their explications are defective, and in some things erroneous, which, it is one of the glories of the Newtonian doctrine of colours, to supply and correct.

The following properties are ascribed to the Rainbow:

1. That it never appears but in a place opposite the sun; so that, when we look directly at it, the sun is always behind us.
2. That when the Rainbow appears, it always rains somewhere.
3. That the constant order of the colours is, that the outmost is red or Saffron colour; the next is yellow; the third is green; the fourth or inmost is Violet or blue; but these colours are not equally bright.
4. Two Rainbows appear together, one of which is higher and larger than the other, and shews the afore-said colours, but in an inverted order.
5. The Rainbow is always exactly round, but does not always appear equally entire, the upper or lower parts being very often wanting.
6. Its apparent breadth is always the same.
7. That those, who stand upon plain low ground, never see above half its circle, and oftentimes not so much.
8. The higher the sun is above the horizon, the less of the circle is seen, and, if there be no cloud to hinder, the lower, the more of it.
9. That never any Rainbow appears, when the sun is above 41 degrees 46 minutes high.

Lunar (Rainbow :) The moon also sometimes exhibits the phenomena of an iris or bow by the refraction of her rays in the drops of rain in the night time.

Aristotle

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Aristotle says, he was the first that ever observed it; and adds, that it never happens, i. e. visible, but at the time of the full moon, her light at other times being too faint to reflect the light. After two refractions and one reflexion, the lunar iris has all the colours of the solar very distinct and pleasant, only faint, in comparison of the other, both from the different intensity of the rays, and the different disposition of the medium.

Marine (Rainbow) is a phenomenon sometimes observed in a much agitated sea, when the wind, sweeping part of the tops of the waves, carries them aloft, so that the sun's rays falling upon them, are refracted, &c. as in a common shower, and paint the colours of the bow.

F. Bourzes, in the Philosophical Transactions, observes that the colours of the Marine Rainbow are less lively, distinct, and of less duration, than those of the common bow; that there are scarce above two colours distinguishable, a dark yellow on the side next the sun, and a pale green on the opposite side. But these bows exceed as to number, there being sometimes twenty or thirty seen together; they appear at noon-day, and in a position opposite to that of the common bow, i. e. the concave side is turned upwards, as indeed it is necessary it should be, from what may be said in accounting for the appearance of the solar bow.

RAMPIONS. See CAMPANULA RADICE ESCULENTA.

RAMSONS. See ALLIUM.

RAMUS, a branch, is the division of a stalk; in trees it is often called a bough.

RANDIA. Houst. Gen. Nov. 28. Lin. Gen. Plant. 194.

The CHARACTERS are,

The empalement of the flower is permanent, of one leaf, cut into five short segments at the brim. The flower is funnel-shaped, of one petal, cut into five parts at the top; it hath five short stamina terminated by oblong erect summits, and an oval germen supporting a cylindrical style, the length of the tube divided into two parts at the top, crowned by two obtuse unequal stigmas. The germen afterward becomes an oval capsule with one cell, having a hard cover, including many compressed cartilaginous seeds surrounded with pulp.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

We know but one SPECIES of this genus at present in the English gardens, viz.

RANDIA (*Mitis*) foliis ovatis emarginatis, spinis geminatis, caule fruticoso. *Randia* with oval leaves which are indented at the top, spines growing by pairs, and a shrubby stalk. *Randia* frutescens, spinis bijugis, foliis subrotundis floribus albis. Houst. MSS. *Shrubby Randia* with double spines, roundish leaves, and white flowers. Sir Hans Sloane titles it in the History of Jamaica, *Lycium forte*, foliis subrotundis integris, spinis & foliis ex adverfo fitis. Vol. i. p. 40. *Boxthorn* with roundish entire leaves, which, as well as the spines, are placed by pairs.

This plant grows naturally at La Vera Cruz, where the late Dr. Houstoun found it in plenty, and sent the seeds to Europe; he gave this title to the genus in honour of Mr. Isaac Rand, who was a curious botanist. It was discovered by Sir Hans Sloane in the island of Barbadoes.

It rises with a shrubby stalk to the height of ten or twelve feet, covered with a whitish bark. The branches come out opposite from the side of the stalk, each pair crossing the other; the leaves are of a thick consistence, about an inch long, and three quarters broad, a little indented at the top, and are placed by pairs standing upon short foot-stalks. At the joints immediately under the leaves are produced two short spines standing opposite. The flowers are produced from the side of the branches; they are small, white, tubulous, and divided at the brim slightly into five parts. These are succeeded by oval berries about the

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size of a marble, having a brittle shell under a thin skin, with one cell, inclosing many compressed seeds surrounded with a black pulp. It is propagated by seeds, which should be sown early in the spring in pots filled with light fresh earth, and plunged into a hot-bed of tanners bark, observing to water the earth frequently but gently, to promote the vegetation of the seeds. When the plants come up, they must have fresh air admitted to them every day when the weather is warm, and should be often refreshed with water. In about a month's time after the plants are up, they will be fit to transplant, when they should be carefully shaken out of the pots, and each planted into a separate small pot filled with light fresh earth, and then plunged into the hot-bed again, where they must be screened from the sun until they have taken new root; after which time, they must have air and moisture in proportion to the warmth of the season. The plants may remain in the hot-bed till toward Michaelmas, when the nights begin to be cold, at which time they should be removed into the stove, and if they are plunged into the bark-bed, it will greatly forward their growth, though they will live in the dry stove, if they are kept in a moderate temperature of heat. During the two first seasons, while the plants are young, it will be proper to keep them constantly in the stove, but their leaves must be washed whenever they contract filth; this will bring them forward; but, after the plants have obtained strength, they may be exposed every summer to the open air in the warmest part of the year for two or three months, provided they are placed in a warm situation, but in winter they must be constantly placed in a stove, and kept in a moderate warmth, otherwise they will not live in this country.

The leaves of this plant continue green throughout the year, which renders the plant valuable, because it makes an agreeable variety in the winter season, when mixed with other tender plants.

RANUNCULUS. Tourn. Inst. R. H. 285. tab. 149. Lin. Gen. Plant. 619. [so called, as some say, from Rana, Lat. a frog, on account of its delighting to grow in moist places, which frogs frequent.] Crow-foot.

The CHARACTERS are,

The empalement of the flower is composed of five oval concave leaves; the flower has five obtuse petals, which have a narrow base; each of these have an open nectarium upon their tails. It hath many stamina, about half the length of the petals, terminated by oblong, erect, twin summits, and numerous germen collected in a head having no styles, but are crowned by small reflexed stigmas. The germen afterward become seeds of uncertain irregular figures, fastened to the receptacle by very short foot-stalks.

This genus of plants is ranged in the seventh section of Linnæus's thirteenth class, which contains those plants whose flowers have many stamina and germen. I shall not here enumerate all the species of this genus, many of which are common weeds in most parts of England, and others are so in several parts of Europe, so are rarely admitted into gardens, therefore I shall only mention those sorts which are cultivated in gardens, or have double flowers.

The SPECIES are,

1. RANUNCULUS (*Acris*) calycibus patulis, pedunculis teretibus, foliis tripartito-multifidis, summis linearibus. Lin. Flor. Suec. 466. flore pleno. *Ranunculus* with a spreading empalement, a taper foot-stalk, many-pointed leaves divided by threes, and those at the top linear and bearing a double flower. *Ranunculus hortensis* erectus, flore pleno. C. B. P. 179. *Upright Garden Ranunculus* with a double flower.
2. RANUNCULUS (*Repens*) calycibus patulis, pedunculis sulcatis, repentibus, foliis compositis. Flor. Suec. 468. flore pleno. *Ranunculus* with a spreading empalement, furrowed foot-stalks, creeping shoots, and compound leaves with a double flower. *Ranunculus hortensis* inclinans. C. B. P. 179. *Inclining Garden Ranunculus*.

3. **RANUNCULUS** (*Creticus*) foliis radicalibus reniformibus crenatis sublobatis, caulinis tripartitis lanceolatis integerrimis, caule multifloro. Lin. Sp. Plant. 550. *Ranunculus with kidney-shaped lower leaves, which are crenated and almost divided into lobes, but those upon the stalks divided into three spear-shaped lobes which are entire, bearing many flowers on a stalk. Ranunculus asphodeli radice Creticus. C. B. P. 181. Asphodel-rooted Ranunculus of Crete.*
4. **RANUNCULUS** (*Aconitifolius*) foliis omnibus quinatis lanceolatis inciso-ferratis. Hort. Cliff. 229. flore pleno. *Ranunculus with all the leaves divided into five spear-shaped segments which are sawed, and bear a double flower. Ranunculus folio aconiti, flore albo multiplici. C. B. P. 179. Ranunculus with a Wolfsbane leaf and a double white flower, commonly called Mountain Ranunculus.*
5. **RANUNCULUS** (*Gramineus*) foliis lanceolato-linearibus sessilibus, caule erecto radice bulbofo. Lin. Sp. Plant. 773. *Ranunculus with linear leaves sitting close to the stalk, which is erect, having very long foot-stalks to the flowers. Ranunculus montanus, folio gramineo. C. B. P. 181. Mountain Ranunculus with a Grass leaf.*
6. **RANUNCULUS** (*Rutæfolius*) foliis supra decompositis, caule simplicissimo unifolio, radice tuberosa. Hort. Cliff. 230. flore pleno. *Ranunculus with leaves which are compounded above, a single stalk bearing one leaf, and a tuberous root with a double flower. Ranunculus rutaceo folio, flore pleno, luteo, minori. Flor. Bat. 2, 3. Rue-leaved Ranunculus with a smaller double yellow flower.*
7. **RANUNCULUS** (*Auricomus*) foliis radicalibus reniformibus crenatis incis, caulinis digitatis linearibus, caule multifloro. Hort. Cliff. 229. flore pleno. *Ranunculus with kidney-shaped, crenated, lower leaves, those on the stalks hand-shaped and linear, and stalks bearing many flowers. Ranunculus dulcis multiflorus. Tab. Icon. 53. Sweet-smelling Ranunculus bearing many flowers.*
8. **RANUNCULUS** (*Amplexicaulis*) foliis ovatis acuminatis amplexicaulibus, caule radice fasciculatâ. Hort. Cliff. 229. *Ranunculus with oval, acute-pointed leaves which embrace the stalks, many flowers upon a stalk, and roots growing in bunches. Ranunculus montanus, folio plantaginis. C. B. P. 180. Mountain Ranunculus with a Plantain leaf.*
9. **RANUNCULUS** (*Grandiflorus*) caule erecto bifolio, foliis multifidis, caulinis alternis sessilibus. Flor. Leyd. Prod. 492. *Ranunculus with an erect stalk, having two leaves which are many-pointed, and those upon the stalks alternate sitting close. Ranunculus Orientalis, aconiti folio, flore maximo. Tourn. Cor. 22. Eastern Ranunculus with a Wolfsbane leaf and a large flower.*
10. **RANUNCULUS** (*Sanguineus*) foliis ternatis biternatifque, foliolis trifidis obrutis, caule simplici. *Ranunculus with leaves placed by threes, which are divided again into twice trifoliate leaves, ending in three obtuse points, with a simple stalk. Ranunculus asphodeli radice, flore sanguineo. C. B. P. 281. Asphodel-rooted Ranunculus with a bloody flower.*
11. **RANUNCULUS** (*Astaticus*) foliis ternatis biternatifque, foliolis trifidis incis, caule infernè ramoso. Lin. Sp. 552. *Ranunculus with trifoliate and twice trifoliate leaves, whose lobes are trifid, cut, and a stalk branching at the bottom. Persian Ranunculus.*

The first sort is a variety of the common upright Meadow Ranunculus, which grows naturally in every pasture; but as this hath double flowers, so it is cultivated in gardens. The stalks of this are erect, and rise more than a foot high; the lower leaves have very long foot-stalks; they are divided into several segments, resembling those of the Aconite, or Monk's-hood; the leaves toward the top of the stalk are cut into linear segments to the bottom; the stalk branches at the top into several foot-stalks, which are terminated by double yellow flowers. These appear in May, and if they stand in a shady situation, will continue a month in flower; and many times in moist seasons, there are small flowers rising out of the middle of the others. This is propagated by parting of the roots in autumn,

and should be planted in a moist soil and a shady situation.

The second sort is a variety of the common creeping Crow-foot, which grows naturally in cultivated fields in most parts of England. The shoots from the root of this sort trail upon the ground, and put out roots from every joint in the manner of the Strawberry, so that when it is once introduced into a garden, it will multiply fast enough; the leaves and stalks are hairy, the flowers are yellow and double, but small. It flowers the latter end of May.

The third sort grows naturally in Crete; this hath an Asphodel root; the lower leaves are large, kidney-shaped, and a little hairy, about three inches long and four broad; they are deeply crenated on their borders, and are divided almost into five lobes, and have long foot-stalks which are hairy. The stalks rise about nine or ten inches high, and are garnished with two or three leaves, which are cut into three segments, and are entire; the top of the stalk divides into several foot-stalks, each sustaining one large, pale, yellow flower. This sort flowers the beginning of June. It is propagated by offsets from the roots, in the same way as the Garden Ranunculus, and should be planted in a warm border, otherwise the frost will destroy the roots.

The fourth sort grows naturally upon the Alps, with a single flower, but the double has been obtained by seeds, and is preserved in many curious gardens for the beauty of its flowers. This is by some gardeners called the Fair Maid of France; it hath a perennial root, composed of many strong fibres; the leaves are divided into five spear-shaped lobes; the four side lobes are upon foot-stalks coming from the side of the principal stalk, and the middle one terminates it; they are deeply sawed on their edges, and have several longitudinal veins. The stalks rise a foot and a half high, and branch out at the top into three or four divisions, at each of which there is one leaf, of the same shape with the lower, but smaller. The flowers are pure white, and very double, each standing upon a short foot-stalk. It flowers in May. This is propagated by parting the roots in autumn, as soon as the leaves decay, and should be planted in an east border and a loamy soil, not too stiff.

The fifth sort grows naturally on the Alps; this has a perennial root; the leaves are long and narrow like those of Grass, sitting close to the stalks, which rise a little more than a foot high, dividing at the top into three or four slender foot-stalks, which are terminated by single yellow flowers like those of the common Butterflower. This flowers the beginning of May. There is a double flower of this kind in the Paris Garden, but we have not yet got it in England.

The sixth sort grows naturally in Austria, and also in the Levant. This hath a tuberous root, the leaves compounded and smooth; the stalks rise near a foot high, and have one leaf of the same shape with the lower, but smaller; the stalk is terminated by one double flower, about the size of the common Butterflower, but of a fine bright yellow colour. This flowers in the end of May. It is propagated by offsets from the roots in the same way as the Garden Ranunculus, and must be planted in a warm border, otherwise the frost will destroy the roots in winter.

The seventh sort is a variety of the common sweet Wood Ranunculus, which hath a double flower. This is a very hardy plant; it may be easily propagated by the root, and should have a loamy soil and a shady situation.

The eighth sort grows naturally upon the Alps and Apennine Mountains, where it seldom rises more than six inches high; the leaves are narrow, and but one flower upon a stalk; but when it is planted in a garden, the stalks rise a foot and a half high, and are garnished with oval acute-pointed leaves, three inches long, and one inch and a half broad, smooth, of a grayish colour, embracing the stalks with their base; this branches out at the top into several foot-stalks, each sustaining one white flower. This flowers in the middle

middle of April, and continues near a month in beauty, if planted in a shady place. It is propagated by parting of the roots in autumn, soon after the leaves decay, and may be planted on a shady border, where it will thrive exceedingly.

The ninth sort was discovered by Dr. Tournefort in the Levant; this hath a perennial root, from which arise several leaves, cut into many points like those of Wolfsbane; the stalk rises a foot high, and is garnished with two leaves which sit close together, and are alternate. This is terminated by one single yellow flower, much larger than that of the Butterflower, and blows in May. It is propagated by parting the roots in autumn, and should be planted in a light loamy soil.

The tenth sort is common in the English gardens, and was some years past more so than at present; for since the Persian *Ranunculus* has been introduced here, and so many fine varieties have been obtained from seeds, they have almost banished this sort out of the gardens. It hath a grumous root like the Persian sort; the leaves are divided by threes, and those are twice again divided by threes, and are obtuse-pointed; the stalk rises about nine inches high, terminated by one large double red flower. This appears the latter end of April, and have sometimes one or two very small flowers branching out from the side.

The eleventh sort was originally brought from Persia, but since it has been in Europe, has been greatly improved by culture, and many new flowers obtained from seeds, amongst which are many with semidouble flowers, which produce seeds; and from these there are such prodigious varieties of new flowers annually obtained, which are so large, and of such variety of beautiful colours, as to exceed all other flowers of that season, and even vie with the most beautiful Carnations; these are many of them finely scented, and the roots, when strong, generally produce twenty or thirty flowers upon each; which, succeeding each other, continue in beauty a full month or longer, according to the heat of the season, or the care taken to defend them from the injuries of the weather; all which excellent qualities have rendered them so valuable, that the old sorts are almost disregarded except in some old gardens.

All the very double flowers never produce seeds, so that they are only multiplied by offsets from their roots, which they generally produce in great plenty, if planted on a good soil, and duly attended in winter. The season for planting their roots is any time in October, for if they are planted sooner, they are apt to come up in a short time, and grow pretty rank before winter, whereby they will be in greater danger of suffering by frost; and if they are planted much later, they will be in danger of perishing under ground; so that you should not keep them out of the ground any longer than the beginning or middle of October. The beds in which the Persian *Ranunculus* roots are planted, should be made with fresh, light, sandy earth, at least three feet deep: the best soil for them may be composed in this manner, viz. Take a quantity of fresh earth from a rich upland pasture, about six inches deep, together with the green sward; this should be laid in a heap to rot for twelve months before it is mixed, observing to turn it over very often, to sweeten it and break the clods; to this you should add a fourth part of very rotten neats dung, and a proportionable quantity of sea or drift-sand, according as the earth is lighter or stiffer; if it be light and inclining to a sand, there should be no sand added; but if it be a hazel loam, one load of sand will be sufficient for eight loads of earth; but if the earth is strong and heavy, the sand should be added in a greater proportion; this should be mixed eight months or a year before it is used, and should be often turned over, in order to unite their parts well together before it is put into the beds.

The depth which this should be laid in the beds, must be about three feet, and should be below the surface, in proportion to the dryness or moisture of the place

where the beds are situated; for in dry ground it should be two feet eight inches below the surface, and the beds raised four inches above; but in a moist place they should be two feet below, and one foot above the ground; and in this case, it will be very proper to lay some rubbish and stones in the bottom of each bed, to drain off the moisture; and if upon this, at the bottom of the beds, some very rotten neats dung is laid two or three inches thick, the roots will reach this in the spring, and the flowers will be the fairer. This earth I would by no means advise to be screened very fine, only in turning it over each time, you should be careful to break the clods, and throw out all large stones, which will be sufficient; for if it is made very fine, when the great rains in winter come on, it will cause the earth to bind into one solid lump, whereby the moisture will be detained, and the roots, not being able to extend their tender fibres, will rot. Of this I have had many examples, but one particularly to my cost: when I had procured a fine parcel of these roots from abroad, and being desirous of having them thrive very well, I took great pains to screen the earth of my beds very fine, which I had laid above two feet deep, and planted a good part of my roots therein; but the season advancing, and having a great deal of other business upon my hands, I did not screen the earth of all my beds, but planted some of them without doing any thing more than raking them; and the success was, that the roots in those beds which were screened did, great part of them, entirely rot; and the remaining part were so weak, as not to produce any good flowers; whereas those which were planted in the beds which were not screened, did thrive and flower very well, and scarce any of the roots failed, though the earth of all the beds was the same, and were in the same situation, both with regard to wind and sun; so that the damage which those roots sustained, was owing entirely to the fineness of the earth; and this I have several times since observed in other gardens.

I am aware that this depth of three feet, which I have here directed to make the beds of these flowers, will be objected to by many persons, on account of the expence and trouble of preparing them, as also supposing it necessary to make the beds so deep, for flowers whose roots are small; but if they will give themselves the trouble of making the experiment, by preparing one bed in this manner, and another in the common way, and plant them both with the same flowers, they will soon be convinced of their error, by the success of the flowers. For in the beds which have been prepared of this depth, I have seen one root produce upward of fifty flowers, each of which grew near a foot high, and were extremely large and fair; whereas in the common method of culture, they are thought to do very well when they produce eight or ten flowers on each root, and these grow six inches high; but if a person will trace the length of the small fibres of these roots, he will find them extend three or four feet downwards. And as it is by these distant fibres that the nourishment is taken in, for the increase and strength of the flowers; so if these meet with a poor barren soil below, they shrink, and the flowers are starved for want of proper nourishment in the spring, when it is most required.

The beds being thus prepared, should lie a fortnight to settle before the roots are planted, that there may be no danger of the earth settling unequally after they are planted; which would prejudice the roots, by having hollow places in some parts of the bed, to which the water would run and lodge, and so rot the roots there. Then having levelled the earth, laying the surface a little rounding, the beds should be marked out in rows by a line, at about six inches distance each way, so that the roots may be planted every way in strait lines; then you should open the earth with your fingers at each cross, where the roots are to be planted, at about two inches deep, placing the roots exactly in the middle, with their crowns upright; then with the head of a rake you should draw the earth up-
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on the surface of the bed level, whereby the top of the roots will be covered with earth near two inches, which will be sufficient. This work should be done in dry weather, because the earth will then work better than if it were wet; but the sooner after planting there happens to be rain, the better it will be for the roots; for if it should prove dry weather long after, and the earth of the beds be very dry, the roots will be subject to mould and decay; therefore in such a case it will be proper to give a little water to the beds, if there should no rain happen in a fortnight's time, which indeed is very rare at that season of the year, so that they will seldom be in danger of suffering that way. When the roots are thus planted, there will no more be required until toward the end of November, by which time they will begin to heave the ground, and the buds of their leaves appear; when you should lay a little of the fresh earth, of which the beds were composed, about half an inch thick over the beds, which will greatly defend the crown of the root from frost; and when you perceive the buds to break through this second covering, if it should prove very hard frost, it will be very proper to arch the beds over with hoops, and cover them with mats, but especially in the spring, when the flower-buds will begin to appear; for if they are exposed to too much frost, or blighting winds at that season, their flowers seldom open fairly, and many times their roots are destroyed.

In the beginning of March the flower-stems will begin to rise, at which time you should carefully clear the beds from weeds, and stir the earth with your fingers between the roots, being very careful not to injure them; this will not only make the beds appear handsome, but also greatly strengthen their flowers in blowing; and if the nights prove frosty, the beds should be covered with mats every evening, and shaded from the sun in the heat of the day. When the flowers are past and the leaves are withered, you should take up the roots, and carefully clear them from the earth; then spread them upon a mat to dry, in a shady place; after which they may be put up in bags or boxes in a dry room, until the October following, which is the season for planting them again.

These Persian sorts are not only propagated by offsets from the old roots, but are also multiplied by seeds, which the semi-double kinds produce in plenty; therefore, whoever is desirous to have these in perfection, should annually sow their seeds, from which new varieties will be every year produced; but in order thereto, you should be careful in saving your seed, or in procuring it from such persons as understand how to save it; that is, who will be careful not to leave any flowers for seeds, but such as have five or six rows of petals at least, and are well coloured; for since these flowers increase plentifully, it is not worth the trouble to sow any indifferent seeds, because there can be but little hopes of obtaining any good flowers from them.

Being prepared with seeds, about the middle of August, which is the proper season for sowing them, you should get some large pots, flat seed-pans, or boxes. These should be filled with light rich earth, levelling the surface very even; then sow the seeds thereon pretty thick, and cover it about a quarter of an inch thick with the same light earth; after which, you should remove these pots, pans, or boxes, into a shady situation, where they may have the morning sun until ten of the clock; and if the season prove dry, you must often refresh them gently with water, being very careful in doing of this, not to wash the seeds out of the ground. In this situation the pots should remain until the beginning of October, by which time the plants will sometimes begin to come up, (though often the seeds will remain in the earth until the end of November, before the plants appear;) but then you should remove the pots into a more open exposure, where they may have the full sun, which at that time is necessary to exhale the moisture of the earth; but toward the middle of November, when you are apprehensive of frost, the pots

should be removed under a common hot-bed frame, where they may be covered with the glasses in the night time, and also in bad weather; but in the day, when the weather is mild, they should be entirely opened, otherwise the plants will draw up too weak. The only danger they are in, is violent rains and frosts; the first often rotting the tender plants, and the frost will often turn them out of the ground, therefore they should be carefully guarded against both these.

In the spring, as the season grows warm, these pots should be exposed to the open air, placing them at first near the shelter of a hedge, to protect them from the cold winds; but toward the beginning or middle of April, they should be removed again into a more shady situation, according to the warmth of the season; and if it should prove dry, they must be sometimes refreshed with water; but you should be careful not to give it them in great quantities, which is very apt to rot these tender roots; and in the latter end of April or beginning of May, they should be placed where they may have only the morning sun; in which place they may remain till their leaves decay, when they may be taken out of the earth, and the roots dried in a shady place; after which they may be put up in bags, and preserved in a dry place till the October following, when they must be planted in the manner before directed for the old roots.

The spring following these roots will flower, at which time you should carefully mark such of them as are worthy to be preserved, and the single, or bad coloured flowers may be pulled and thrown away, which is the surest method of removing them from the good sorts; for if they are permitted to remain together until their leaves decay, there may be some offsets of the bad sorts mixed with the good flowers. You should not suffer those flowers, which you intend to blow fine the succeeding year, to bear seeds, if they are inclinable so to do, but cut off the flowers when they begin to decay; for those roots which have produced seeds, seldom flower well afterwards; nor will the principal old root, which has flowered strong one year, ever blow so fair as will the offsets, which is what should be principally observed, when a person purchases any of these roots; for a great part of the complaints made by those who have bought these roots at a dear rate, is principally owing to this. For the persons who sold them, being apprised of this matter, have parted with their old roots to their purchasers, and reserved the offsets for their own use; which old roots have so much degenerated from what they were the preceding year, as to cause a suspicion, whether the persons they were purchased from had not changed the roots: and this degeneracy always attends these flowers, after having flowered extremely large and fair, or that they have been permitted to seed; so that it is absolutely necessary to sow seeds every year, in order to preserve a succession of good flowers.

The manner of preparing the beds, and the distance and method of planting the roots, having been already directed, I shall not repeat it here, but only observe, that these flowers being tender, must be protected from hard frosts, and cutting sharp winds, especially after Christmas, when their flower-buds are forming; for if they are neglected at that season, their flowers will rarely prove fair; nor should you suffer them to receive too much wet in winter or spring, which is equally as injurious to them as frost. In planting these roots you should observe to place the semi-double kinds, from which you intend to save seeds, in separate beds by themselves, and not intermix them with the double flowers, because they will require to be treated in a different manner; for when the flowers of the semi-double kinds begin to fade, you should carefully guard them from too much wet; for if they are permitted to receive hard rains, or are watered at that season, the seeds rarely come to maturity, or they are so weak, that scarce one in fifty of them will grow.

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When the seed begins to ripen (which may be easily known by separating from the axis and falling) you should look it over every day, gathering it as it ripens; for there will be a considerable distance in the seeds of the same bed coming to maturity, at least a fortnight, and sometimes three weeks or a month. When you gather the seed, it should not be exposed to the sun, but spread to dry in a shady place; after which, you must put it up where the vermin cannot come to it, until the time of sowing it.

By this method of sowing seeds every year, you will not only increase your stock of roots, but also raise new varieties, which may be greatly mended by changing the seeds into fresh ground; for if a person continually sows his seed in the same garden many years, they will not produce near so fine flowers as if he procured his seeds at some distance, which is also the case with most other plants.

It will also be necessary to take away all the earth out of the beds in which the roots were blown the preceding year, and put in new, if you intend to plant *Ranunculuses* there again; otherwise they will not thrive near so well, notwithstanding you may add some new compost to the beds, and this is what all the curious florists continually observe.

R A P A. Tourn. Inst. R. H. 228. tab. 112. Brassica. Lin. Gen. Plant. 734. Turnep; in French, *Navet*.

The CHARACTERS are,

The empalement of the flower is three-leaved, coloured, and erect. The flower hath four plain spreading petals, which are narrow at their base and entire. It has four oval honey glands, situated between the stamens and style, and six erect awl-shaped stamens; the two which are opposite are the length of the empalement, the other four are longer, terminated by erect acute-pointed summits. It hath a taper germen, supporting a short thick style, crowned by an entire beaded stigma. The germen afterward becomes a long taper pod depressed on the sides, opening in two cells, which are filled with roundish seeds.

This genus of plants is ranged in the second section of Linnæus's fifteenth class, which includes those plants whose flowers have two short and four longer stamens, and the seeds are in oblong pods; and he joins this genus to the *Brassica*, which, in a system of botany may be allowable, though not in a treatise of gardening.

The SPECIES are,

1. RAPA (*Rotunda*) radice caulescente orbiculata depressâ carnosâ. Turnep with an orbicular, depressed, fleshy root. Rapa sativa rotunda radice candidâ. C. B. P. 89. Garden Turnep with a white root.
2. RAPA (*Oblonga*) radice oblongâ carnosâ. Turnep with an oblong fleshy root. Rapa sativa, oblonga, seu fœmina. C. B. P. 90. Turnep with an oblong root, or female Turnep.
3. RAPA (*Napus*) radice caulescente fusiformi. Turnep with a spindle-shaped root. Napus sativa, radice albâ. C. B. P. 95. Garden Naphew with a white root, commonly called French Turnep.

The first is the Turnep which is commonly cultivated in the fields, of which there are the following varieties, viz. The round, red, or purple-topped Turnep, the green-topped Turnep, the yellow Turnep, the black-rooted Turnep, and the early Dutch Turnep. The last sort is commonly sown early in the spring, to supply the markets in May and June, but is never cultivated for a general crop. The red-rooted Turnep was formerly more cultivated in England than at present; for since the large green-topped Turnep has been introduced, all the skilful farmers prefer it to the other sorts; the root of this will grow to a large size, and continue good much longer than the other sorts. The next to this is the red or purple-topped Turnep, which will also grow large, and are extremely good for some time; but the roots of this will become stringy much sooner than those of the green-topped. The long-rooted Turnep, the yellow Turnep, and the blackish-rooted Turnep, are now rarely cultivated in England, neither of them being so good for the table or for feed as the red, and par-

ticularly the green-topped Turnep, though there are some few persons who sow them for the sake of variety. The early Dutch Turnep is chiefly sown in the spring, to supply the table before any of the sorts can be procured; and when they are drawn off young, are tolerably good; but if they are left to grow large, they are stringy and very rank, so are unfit for use.

The French Turnep is not much cultivated in England, but in France and Holland they are in great esteem, especially for soups; their roots being small, are boiled whole in the soup, and so served up to the table; these must also be used while they are young, otherwise they will become rank and stringy.

These are by some supposed to be only varieties which have been accidentally obtained from seeds, therefore I have not enumerated them as distinct species; but yet I am certain they are constant where care is taken in the saving of their seeds, not to suffer any mixture of plants to stand for seeds: I have sown of three or four sorts several years, and have always found them retain their differences; however, it is not easy to determine, if some of these were not by culture first obtained from the seeds of the common white Turnep. The yellow Turnep seems most unlikely to have been an accidental variety, for I have never known this alter, and the roots are yellow within, whereas all the other have white flesh, notwithstanding their outsides are of very different colours.

The long-rooted Turnep is, I think, a distinct species, the form of the root, and its manner of growth being totally different from the other sorts. I have seen these roots as long as those of some Parsneps, and nearly of the same shape; these run deep into the ground, so are unfit for feeding cattle; and unless they are used very young, become strong, so not proper for the table, which has occasioned their being rejected of late years.

The green-topped Turnep grows above the ground more than any of the other, which renders it preferable for feeding cattle, and being the softest and sweetest root when grown large of any of the kinds, is most esteemed for the table; but in very severe winters, they are in greater danger of suffering by frost, than those whose roots lie more in the ground, especially if they are not covered by snow; for when they are frequently hard frozen and thawed, it causes them to rot sooner than those whose flesh is less tender and sweet. I have seen the roots of this sort, which were more than a foot diameter boiled, and were as sweet and tender as many of the smallest roots.

Turneps delight in a light, sandy, loamy soil, which must not be rich, for in a rich soil they grow rank and are sticky; but if it be moist, they will thrive the better in summer, especially in fresh land, where they are always sweeter than upon an old worn out, or a rich soil.

The common season for sowing of Turneps, is any time from the beginning of June till the middle of August, or a little later, though it is not advisable to sow them much after; because, if the autumn should not prove very mild, they will not have time to apple of a proper size before winter; nor will the roots of those which are sown after the end of July grow very large, unless the frost keeps off long in autumn. But, notwithstanding this is the general season in which the greatest part of Turneps are sown in the country, yet about London they are sown successively from March to August, by those who propagate them to supply the markets with their roots; but there is a great hazard of losing those which are sown early in the year, if the season should prove dry, by the fly, which will devour whole fields of this plant while young; so that where a small quantity for the supply of a family is wanted, it will be absolutely necessary to water them in dry weather; and where a person sows those seeds in April and May, it should always be upon a moist soil, otherwise they seldom come to good, the heat of the weather at that season being too great for them upon a dry soil; but those which

are intended for the general crop, are sown toward the latter end of June, when they commonly receive some refreshing showers to bring them forward; without which, it is very common to have them all destroyed.

These seeds should always be sown upon an open spot of ground; for if it is near hedges, walls, buildings, or trees, they will draw up, and be very long topped, but their roots will not grow to any size. They are sown in great plenty in the fields near London, not only for the use of the kitchen, but for cattle in winter, when there is a scarcity of other food; and by this way is become a great improvement to barren sandy lands, particularly in Norfolk, where, by the culture of Turneps only, many persons have doubled the yearly value of their ground.

The land upon which this seed is sown, should be ploughed in April, and twy-fallowed in May, that is, once more ploughed, and twice well harrowed, and made very fine; then the seed should be sown pretty thin (for it being small, a little will sow a large piece of ground; two pounds of this seed is full sufficient for an acre of any land, but one pound is the common allowance.) The seed must be harrowed in as soon as it is sown, with a short tined harrow, and the ground rolled with a wooden roll, to break the clods and make the surface even. In ten days or a fortnight after sowing, the plants will come up, at which time, if the season should prove dry, they will be in great danger of being destroyed by the fly, which is too often the case with this crop; but if it so happen, the ground must be sowed again; for the seed being cheap, the chief expence is the labour; but the ground should be first harrowed to loosen it, especially if it is stiff land; there have been many directions given for to prevent this destruction, but scarce one has succeeded on trial.

When the plants have got four or five leaves, they should be hoed to destroy the weeds, and to cut up the plants where they are too thick, leaving the remaining ones about six or eight inches asunder each way, which will be room enough for the plants to stand for the first hoeing; and the sooner this is performed, when the plants have four leaves, the better they will thrive; but in the second hoeing, which must be performed about a month after the first, they should be cut up, so that the remaining plants may stand fourteen or sixteen inches distance, or more, especially if they are designed for feeding of cattle; for where the plants are allowed a good distance, the roots will be proportionably large, provided the ground is good; so that what is lost in number, will be overgained by their bulk, which is what I have often observed. But in such places where they are sown for the use of the kitchen, they need not be left at a greater distance than a foot, because large roots are not so generally esteemed for the table.

It is not many years since the practice of sowing Turneps for feeding of cattle has been of general use; how it happened that this improvement should have been so long neglected in every part of Europe, is not easy to determine; since it is very plain, that this piece of husbandry was known to the ancients. For Columella, in treating of the several kinds of vegetables which are proper for the field, recommends the cultivating Rapa in plenty; because (says he) those roots which are not wanted for the table, will be eaten by the cattle. And yet this plant was not much cultivated in the fields till within a century past; nor is the true method of cultivating Turneps yet known, or at least not practised, in some of the distant counties of England at this time. For in many places the seed is sown with Barley in the spring, and those plants which come up, and live till the Barley is cut, produce a little green for the sheep to pick up, but never have any roots. In other places, where the Turnep-seed is sown by itself, the method of hoeing them is not understood, so that weeds and Turneps are permitted to grow together, and where the Turneps come up thick in patches, they are never thinned; so that they draw up to have

long leaves, but never can have good roots, which is the principal part of the plant, therefore should be chiefly attended to.

The general method now practised in England, for cultivating this plant in the fields, is the same as is practised by the farming gardeners, who supply the London markets with these roots, which is as before directed. But it is only within the compass of half a century, that the country people have been acquainted with the method of hoeing them; so that the farmers usually employed gardeners, who had been bred up in the kitchen-gardens, to perform this work. And the usual price given per acre, for twice hoeing and leaving the crop clean, and the plants set out properly, was seven shillings; at which price the gardeners could get so much per week, as to make it worth their while to leave their habitations, and practise this in different counties during the season for this work, which always happens after the greatest hurry of business in the kitchen-garden is over; so that they usually formed themselves in small gangs of six or seven persons, and set out on their different routs, each gang fixing at a distance from the rest, and undertaking the work of as many farmers in the neighbourhood as they could manage in the season; but as this work is now performed by many country labourers, that practice is lost to the kitchen-gardeners, the country labourers doing it much cheaper.

There has also been another method practised very lately, by some very curious farmers, in cultivating of Turneps; which is, by sowing the seed in rows with the drill plough. In some places the rows have been sown three feet asunder, in others four, in some five, and some six. The latter has been commended by skilful persons as the most proper distance; for although the intervals are so large, yet the crop produced on an acre has been much greater than upon the same quantity of land where the rows have been but half this distance; and upon all the fields which have been cultivated for Turneps, the crops have greatly exceeded those which have been hand-hoed. The late Lord Viscount Townshend was at the expence of making the trial of these two different methods of husbandry, with the greatest care, by equally dividing the same fields into different lands, which were alternately sown in drills, and the intermediate lands in broad-cast. The latter were hoed by hand, in the common method, and the other cultivated by the hoeing plough; and when the roots were fully grown, his Lordship had an equal quantity of land, which had been sown in different methods, measured, and the roots drawn up and weighed; and those roots which had been cultivated by the plough, were so much larger than the other, that the crop of one acre, weighed a ton and a half more than that of an acre in the other husbandry.

But when the Turneps are sown in drills, they will require to be hoed by hand, to separate and cut out the plants where they are too near together in the rows, as also to cut up the weeds between the plants, where the plough cannot reach them. If this is carefully performed, the ploughing of the intervals will encourage the growth of the roots, by thus stirring of the ground, and prepare it much better for the crop of Barley, or whatever else is sown the following spring. This method of culture may be supposed to be more expensive than that commonly practised, by those unacquainted with it; but those who have made trials of both, find the horse-hoeing to be much the cheapest, and by far the best. For the country people, who are employed in hand-hoeing of Turneps, are very apt to hurry over their work, so that half the weeds are left growing, and the plants are seldom singled out so well as they should be; nor are they curious enough to distinguish the Charlock (which is one of the most common weeds in arable land) from the Turneps; so that about the middle of September, it is very common to see the fields of Turneps full of the yellow flowers of the Charlock. Now, in the

horse.

horse-hoing, all the weeds in the intervals will be entirely destroyed; so that if a few plants of Charlock in the rows of Turneps should be overlooked, they may be easily drawn out when they appear visible; and by this method, the land will be sooner and better cleaned from weeds.

The greatest evil which attends a crop of Turneps, is that of their being destroyed by the fly, which usually happens soon after the plants come above ground, or while they are in the seed leaf; for, after they have put out their rough leaves pretty strong, they will be past this danger. This always happens in dry weather, so that if there should be rain when the Turneps come up, they will grow so fast, as to be in a few days out of danger from the fly; and it hath been found, that those, which have been sown in drills, have escaped the fly much better than those sown in broad-cast; but if foot is sown along the surface of each drill, it will be of great service to keep off the fly, and a small quantity of it will be sufficient for a large field, where the drills only are to be covered.

Another danger of the crops being destroyed is from the caterpillars, which very often attack them, when they are grown so large as to have six or eight leaves on a plant. The surest method of destroying these insects is to turn a large parcel of poultry into the field, which should be kept hungry, and turned early in the morning into the field; these fowls will soon devour the insects, and clear the Turneps. To this evil the Turneps, which are sown in drills, are not so much exposed, for as the ground between the rows will be kept stirred, the plants will be kept growing, so will not be in danger of suffering from these insects; for the parent insects never deposit their eggs upon any plants which are in health, but as soon as they are stunted, they are immediately covered with the eggs of these insects; and this holds in general with the vegetables as with animals, who are seldom attacked by vermin when they are in perfect health; whereas, when they become unhealthy, they are soon overspread with them, so that it is the disease which occasions the vermin, and not the vermin the disease, as is commonly imagined. Therefore as the plants will always be in greater health when the ground is well stirred about them, there will be less danger of their suffering from these enemies, when they are cultivated by the horse-hoe, than in the common way.

When the Turneps are sown in drills, it will be the best way to hoe between every other row at first, and some time after to hoe the alternate intervals, by which method the plants will receive more benefit from the often stirring the ground, than they would do if all the intervals were hoed at one time, and the plants will be in less danger of suffering from the earth being thrown up too high on some rows, while others may be left too bare of earth; but, when the earth has been thrown up on one side of the drill, it may be turned down again when the next interval is hoed, and this alternate moving of the earth will prepare the ground very well for the succeeding crop, as well as greatly improve the Turneps; but, as this plough cannot well be drawn nearer to the drills than two or three inches, the remaining ground should be forked to loosen the parts, and make way for the fibres of the roots to strike out into the intervals, otherwise, if the land is strong, it will become so hard in those places which are not stirred, as to stint the growth of the Turneps, and this may be done at a small expence; a good hand will perform a great deal of this work in a day, and, whoever will make the trial, will find their account in practising it, especially on all strong land, where the Turneps are much more liable to suffer from the binding of the ground, than they will be on a loose soil; but yet, in all sorts of ground, it will be of great service to practise this.

When the ground is thus stirred in every part, one ploughing will be sufficient, after the Turneps are eaten off the ground, to prepare it for the sowing of

Barley, or any other crop; so that there will be an advantage in this, when the Turneps are kept late on the ground, as will often be the case, especially when they are cultivated for feeding of ewes, because it is often the middle of April before the ground will be cleared; for late feed in the spring, before the natural Grass comes up, is the most wanted, where numbers of sheep and ewes are maintained, and one acre of Turneps will afford more feed than thirty acres of the best pasture at that season.

In Norfolk and some other counties, they cultivate great quantities of Turneps for feeding of black cattle, which turn to great advantage to their farms, for hereby they procure a good dressing for their land; so that they have extraordinary good crops of Barley upon the same ground, which would not have been worth the ploughing, if it had not been thus husbanded.

When the Turneps are fed off the ground, the cattle should not be suffered to run over too much of it at one time; for if they are not confined by hurdles to as much as is sufficient for them one day, the cattle will spoil three times the quantity of Turneps as they can eat, so that it is very bad husbandry to give them too much room; therefore the hurdles should be once or twice every day removed forward, and, if the Turneps are drawn out of the ground before the cattle or sheep are turned into the new inclosure, there will be less waste made, for they will then eat up the whole roots; whereas, if they are turned upon the Turneps-growing, they will scoop the roots, and leave the rinds, which being hollow, the urine of the sheep will lodge in them; so that when they are forked out of the ground, the sheep will not eat any one of those roots which are thus tainted.

I cannot omit taking notice of a common mistake, which has generally prevailed with persons who have not been well informed to the contrary, which is, in relation to the mutton which is fattened with Turneps, most people believing it to be rank and ill tasted, whereas it is a known fact, that the best mutton this country affords is all fattened on Turneps; and that rank mutton, whose fat is yellow, is what the low marshy lands of Lincolnshire, and other rank pastures, produce.

In order to save good Turnep-seeds, you should transplant some of the fairest roots in February, placing them at least two feet asunder each way, observing to keep the ground clear from weeds, until the Turneps have spread so as to cover the ground, when they will prevent the weeds from growing; and when the seed-pods are formed, you should carefully guard them against the birds, otherwise they will devour it, especially when it is near ripe; at which time you should either shoot the birds as they alight upon the seed, or lay some birdlimed twigs upon it, whereby some of them will be caught; and, if they are permitted to remain some time, and afterwards turned loose, they will prevent the birds from coming thither again for some time, as I have experienced. When the seed is ripe, it should be cut up, and spread to dry in the sun; after which it may be threshed out, and preserved for use.

There have been many receipts for preventing the fly taking Turneps, but few of them deserve notice, therefore I shall only mention two or three which I have seen tried with success. The first was steeping the seeds in water with flower of brimstone mixed, so as to make it strong of the brimstone: another was steeping it in water with a quantity of the juice of Horse-Aloes mixed; both which have been found of use. The sowing of foot or Tobacco-dust over the young plants as soon as they appear above ground, has also been found very serviceable; in short, whatever will add vigour to the young plants will prevent their being destroyed by the fly, for these never attack them till they are stunted in their growth.

RAPHANUS. Tourn. Inst. R. H. 229. tab. 114. Lin. Gen. Plant. 736. [of *πάδιον*, easy, and *φαίνω*, to appear; q. d. a plant easily appearing, for this plant being

being sown, quickly puts forth out of the ground.] Radish; in French, *Raifort*.

The CHARACTERS are,

The empalement of the flower is erect, and composed of four oblong leaves. The flower has four heart shaped petals, placed in form of a cross, which spread open, and are narrow at their base; it hath four honey glands, one on each side the short stamina between them and the style, and one between each of the long stamina and the empalement; it hath six short stamina which are erect; two which are opposite, are the length of the empalement, the other four are as long as the base of the petals, terminated by single summits, and an oblong swelling germen narrowed the length of the stamina, with scarce any style, crowned by a beaded stigma. The germen afterward becomes an oblong, smooth, spongy pod having an acute point, swelling and almost jointed, having two cells divided by an intermediate partition, and filled with roundish seeds.

This genus of plants is ranged in the second section of Linnæus's fifteenth class, which contains those plants whose flowers have four long and two shorter stamina, and their seeds are included in pods.

The SPECIES are,

1. RAPHANUS (*Sativus*) filiquis teretibus torosis bilocularibus. Hort. Cliff. 340. *Radish with taper pods, having two cells. Raphanus minor oblongus. C. B. P. 96. Smaller oblong Radish, or the common Radish.*
2. RAPHANUS (*Rotundus*) radice rotundâ. *Round-rooted Radish, or small, round, Naples Radish.*
3. RAPHANUS (*Orbiculatis*) radice orbiculatâ depressâ. *Radish with an orbicular depressed root. Raphanus major, orbicularis vel rotundus. C. B. P. 96. Greater orbicular, or round Radish, commonly called Turnep-rooted, or white Spanish Radish.*
4. RAPHANUS (*Niger*) radice fusiformi. *Radish with a spindle-shaped root. Raphanus niger. C. B. P. 96. The black Spanish Radish.*
5. RAPHANUS (*Chinensis*) oleiferus. Lin. Sp. 935. *China oily Radish.*
6. RAPHANUS (*Raphanistrum*) filiquis teretibus articulatis lævibus unilocularibus. Hort. Cliff. 340. *Radish with smooth, taper, jointed pods having one cell. Rapistrum flore albo, filiquâ articulatâ. C. B. P. 95. White flowering Charlock with a jointed pod.*

The last sort grows naturally on arable lands in many parts of Europe, so is seldom admitted into gardens.

The other five sorts are supposed to be only seminal variations; but from forty years experience, I have never found either of these to vary from one to the other sort; and I am certain whoever will make the trial, by saving the seeds of each carefully without mixture, will always find the plants prove the same as the seeds were saved from.

The first sort here mentioned is that which is commonly cultivated in kitchen-gardens for its root, of which there are several varieties, as the small-topped, the deep red, the pale red or salmon, and the long-topped striped Radish; all which are varieties arising from culture. The small-topped sort is most commonly preferred by the gardeners near London, because they require much less room than those with large tops, and may be left much closer together; and, as the forward Radishes are what produce the greatest profit to the gardener, these being commonly sown upon borders near hedges, walls, or pales, if they are of the large-topped sort, will be apt to grow mostly to a top, and not swell so much in the root as the other, especially if they are left pretty close.

The seasons for sowing this seed are various, according to the time when they are designed for use; but the earliest season is commonly the end of October, or beginning of November, that the gardeners near London sow them to supply the markets; and these, if they do not miscarry, will be fit for use in the beginning of March following, which is full as soon as most people care to eat them. These are commonly sown on warm borders near walls, pales, or hedges, where they may be defended from the cold

winds; but there are some who sow Radish-seeds among other crops the middle of September, and, if these are not destroyed by frost, they will be fit for use early in February; but these must be eaten while they are young, for they soon grow sticky and strong.

The second sowing is commonly about Christmas, provided the season be mild, and the ground in a fit condition to work; these are also sowed near shelter, but not so near pales and hedges as the first sowing. If these are not destroyed by frost, they will be fit for use the beginning of April; but in order to have a succession of these roots for the table through the season, you should repeat sowing of their seeds once a fortnight, from the middle of January till the beginning of April, always observing to sow the latter crops upon a moist soil and in an open situation, otherwise they will run up and grow sticky before they are fit for use.

Many of the gardeners near London sow Carrot-seed with their early Radishes, so that when their Radishes are killed, which sometimes happens, the Carrots will remain; for the seeds of Carrots commonly lie in the ground five or six weeks before they come up, and the Radishes seldom lie above a fortnight under ground at that season, so that these are often up and killed, when the Carrot-seed remains safe in the ground; but, when both crops succeed, the Radishes must be drawn off very young, otherwise the Carrots will be drawn up so weak, as not to be able to support themselves when the Radishes are gone.

It is also a constant practice with these gardeners to mix Spinach-seed with their latter crops of Radishes, so that when the Radishes are drawn off, and the ground cleaned between the Spinach, it will grow prodigiously, and in a fortnight's time will as completely cover the ground, as though there had been no other crop. And this Spinach, if it be of the broad-leaved kind, will be larger and fairer than it commonly is when sown by itself; because where people have no other crop mixed with it, they commonly sow it too thick, whereby it is drawn up weak, but here the roots stand pretty far apart, so that after the Radishes are gone, they have full room to spread; and if the soil be good, it is a prodigious size this Spinach will grow to before it runs up for seed; but this husbandry is chiefly practised by such gardeners as pay very dear for their land, and are obliged to have as many crops in a year as possible, otherwise they could not afford to pay such large rents.

When the Radishes are come up, and have got five or six leaves, they must be pulled up where they are too close, otherwise they will draw up to a top, but the roots will not increase their bulk. In doing of this, some only draw them out by hand, which is a tedious method; but the best way is to hoe them with a small hoe, which will stir the ground, and destroy the young weeds, and also promote the growth of the Radishes and Spinach. The distance which these should be left, if for drawing up small, may be three inches, but if they are to stand until they are pretty large, six inches are full near enough, and a small spot of ground will afford as many Radishes at each sowing, as can be spent in a family while they are good.

If you intend to save seeds of your Radishes, you should, at the beginning of May, prepare a spot of ground in proportion to the quantity of seeds intended (but you should always make allowance for bad seasons, because it often happens, in a very dry season, that there will not be a fourth part of the quantity of seeds upon the same proportion of ground as there will be in a moist season, though in a dry year the seeds will ripen best.) This ground should be well dug and levelled; then you should draw up some of the straightest and best coloured Radishes (throwing away all such as are short, and that branch out in their roots;) the Radishes should be planted in rows three feet distance, and two feet asunder in the rows, observing, if the season be dry, to water them until they have taken root; after which they will require no farther care, but only to hoe down the weeds between them

them, until they are advanced so high as to spread over the ground, when they will prevent the growth of weeds.

When the seed begins to ripen, you should carefully guard it against the birds, for these will otherwise destroy it. When it is ripe (which you may know by the pods changing brown,) you should cut it, and spread it in the sun to dry; after which you should thresh it out, and lay it up for use, where the mice cannot come to it, otherwise they will eat it up. The small round-rooted Radish is not very common in England, but in many parts of Italy it is the only sort cultivated; the roots of this kind are very white, round, small, and very sweet. This may be propagated in the same manner as the common sort, but with this difference only, viz. That this must not be sown till the beginning of March, and the plants should be allowed a greater distance. The seeds of this kind are very subject to degenerate, when sowed in England, unless those which are planted for seeds are at such a distance from the common sort, as that the farina of one cannot mix with the other.

The other round-rooted Radishes are seldom cultivated in England, but those who have a mind to have them, may sow them in the same manner as the last.

The black and white Spanish Radishes are commonly cultivated for medicinal use, though there are some persons who are very fond of them for the table. These are commonly sown about the middle of July, or a little earlier, and are fit for the table by the end of August, or the beginning of September, and will continue good till the frost spoils them. These must be thinned to a greater distance than the common sort, for the roots of these grow as large as Turneps, therefore should not be left nearer together than six or eight inches.

Some persons who are very curious to have these roots in winter, draw them out of the ground before the hard frost comes on, and lay them up in dry sand in the same manner as is practised for Carrots, being careful to guard them from wet and frost, and by this method they preserve them till the spring.

R A P I S T R U M. See S I N A P I S.

R A P U N C U L U S. Tourn. Inst. R. H. 113. tab. 38. Phyteuma. Lin. Gen. Plant. 203. Rampion.

The CHARACTERS are,

The empalement of the flower is of one leaf, divided into five acute parts sitting upon the germen. The flower hath one petal, which is starry, spreading open, and cut into five linear segments which are recurved; it hath five stamina which are shorter than the petal, terminated by oblong summits. The germen, which is situated under the flower, supports a slender recurved style crowned by an oblong, twisted, three-pointed stigma. It afterward becomes a roundish capsule with three cells, filled with small roundish seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, in which those plants are placed, whose flowers have five stamina and one style.

The SPECIES are,

1. R A P U N C U L U S (*Spicatus*) spicâ oblongâ, capsulis bilocularibus, foliis radicalibus cordatis. Rampion with an oblong spike of flowers, capsules containing two cells, and the lower leaves heart-shaped. Rapunculus spicatus. C. B. P. 92. Spiked Rampion.
2. R A P U N C U L U S (*Comosus*) fasciculo terminali sessili, foliis dentatis, radicalibus cordatis. Rampion with flowers growing in bunches terminating the stalks, indented leaves, and those at the bottom heart-shaped. Rapunculus Alpinus corniculatus. C. B. P. 93. Horned Alpine Rampion.
3. R A P U N C U L U S (*Hemisphericus*) capitulo subrotundo, foliis linearibus integerrimis. Rampion with roundish heads, and linear entire leaves. Rapunculus folio gramineo. Tourn. Inst. 113. Rampion with a Grass leaf.
4. R A P U N C U L U S (*Pauciflorus*) capitulo subfolioso, foliis omnibus lanceolatis. Rampion with heads which are leafy, and all the leaves spear-shaped. Rapunculus Al-

pinus parvus comosus. J. B. 2. p. 811. Small, Alpine, hairy Rampion.

5. R A P U N C U L U S (*Orbicularis*) capitulo subrotundo, foliis ferratis radicalibus cordatis. Rampion with roundish heads and sawed leaves, the lower ones of which are heart-shaped. Rapunculus flore globoso, purpureo. J. B. 2. 810. Rampion with a purple globular flower.

These are all of them hardy plants, which will thrive in the open air. They are propagated by seed, which should be sown in autumn, for if they are kept out of the ground till the spring, they frequently fail, or at least lie a year in the ground. These seeds should be sown on a bed of fresh undunged earth where they are designed to remain, for they do not thrive so well when they are transplanted; therefore the best method is to make small drills cross the bed about eighteen inches asunder, and sow the seeds therein; then cover them lightly over with earth, for if they are buried too deep, they will rot in the ground. In the following spring the plants will come up, when they should be diligently weeded, which is all the care they require; only they should be thinned where they are too close, so as to leave them six or seven inches apart in the rows, and afterward they require no farther attention but to keep them clear from weeds. In June the plants will flower, and if the summer prove favourable, they will produce ripe seeds.

As these plants do not continue above two or three years, there should be seeds sown every other year to continue the sorts, for they are plants which require little trouble to cultivate them, and their flowers make a pretty variety in large gardens, therefore they may be allowed a place amongst other hardy flowers.

R A P U N T I U M. Tourn. Inst. R. H. 163. tab 51. Lobelia. Lin. Gen. Plant. 897. Rampions, or Cardinal's-flower.

The CHARACTERS are,

The empalement of the flower is of one leaf, cut into five linear segments, the two upper being larger than the other. The flower is of one petal; it hath a long cylindrical tube which is a little curved, and divided at the brim into five segments, two of which compose the upper lip, and are smaller than the three lower which compose the under; it hath five awl-shaped stamina the length of the tube, terminated by oblong summits which coalesce at the top in form of a cylinder, but open in five parts at their base, having an acute germen situated below the flower, supporting a cylindrical style crowned by a hairy obtuse stigma. The germen afterward becomes an oval capsule opening at the top, filled with small seeds.

This genus of plants is ranged in the second section of Tournefort's third class, which includes the herbs with an anomalous flower of one petal, having a tube ending in a tongue. Dr. Linnæus has joined the plants of this genus to that of Plumier's Lobelia, making them but one genus; but, as the Lobelia of Plumier has a fleshy berry inclosing a stone with two seeds, and the Rapuntium hath a dry capsule, they should be separated.

The SPECIES are,

1. R A P U N T I U M (*Cardinalis*) caule erecto, foliis lanceolatis ferratis, spicâ terminali. Cardinal's-flower with an erect stalk, spear-shaped sawed leaves, and a spike of flowers terminating the stalk. Rapuntium maximum, coccineo spicato flore. Col. in Rech. 880. The largest Rapuntium with a spike of scarlet flowers, commonly called scarlet Cardinal's-flower.
2. R A P U N T I U M (*Siphiliticum*) caule erecto, foliis ovato-lanceolatis crenatis, calycum sinibus reflexis. Cardinal's-flower with an erect stalk, oval, spear-shaped, crenated leaves, and the sinuses of the empalements reflexed. Rapuntium Americanum, flore dilute cæruleo. H. R. Par. 105. American Cardinal's-flower with a pale blue flower, commonly called the blue Cardinal's-flower.
3. R A P U N T I U M (*Cliffortianum*) caule erecto, foliis cordatis obsolete dentatis petiolatis, floribus sparsis thyrsiformi. Cardinal's-flower with an erect stalk, heart-shaped leaves which are somewhat indented, with foot-

stalks, and the longest spike of flowers which are placed thinly. *Rapuntium Americanum trachelii folio, flore purpurascens.* Plum. Cat. 5. *American Cardinal's-flower, with a Throatwort leaf and a purplish flower.*

4. *RAPUNTIIUM (Urens)* caule erecto, foliis inferioribus subrotundis crenatis, superioribus lanceolatis serratis, spicâ terminali. *Rapuntium with an erect stalk, the lower leaves roundish and crenated, the upper spear-shaped and sawed, and a spike of flowers terminating the stalk.* *Rapuntium urens, soloniense.* H. R. Bloes. *Stinging Cardinal's-flower of Blois.*

5. *RAPUNTIIUM (Inflatum)* caule erecto, foliis ovatis subferratis, pedunculo longioribus, capsulis inflatis. *Cardinal's-flower with an erect stalk, oval leaves which are somewhat sawed and longer than the foot-stalks, and swelling seed-vessels.* *Lobelia caule erecto brachiato, foliis ovato-lanceolatis obsolete incis, capsulis inflatis.* Hort. Cliff. 500. *Lobelia with an erect branching stalk, oval spear-shaped leaves a little cut, and swollen seed-vessels.*

6. *RAPUNTIIUM (Hirtum)* foliis ovalibus crenatis lanatis, floribus lateralibus solitariis. *Cardinal's-flower with oval crenated leaves which are downy, and flowers growing singly from the sides of the stalks.* *Rapuntium foliis subrotundis hirtis, flore ex alis solitario.* Bûrm. Afr. 105. tab. 40. *Rapuntium with roundish hairy leaves, and solitary flowers proceeding from their wings.*

7. *RAPUNTIIUM (Longiflorum)* foliis lanceolatis dentatis, pedunculis brevissimis lateralibus tubo corollæ longissimo. *Cardinal's-flower with spear-shaped indented leaves, very short foot-stalks to the flowers which proceed from the sides of the stalks, and a very long tube to the petal.* *Rapunculus aquaticus, foliis cichorii flore albo tubo longissimo.* Sloan. Hist. Jam. 1. p. 158. *Aquatic Rampion with a Cicory leaf, and a white flower having the longest tube.*

8. *RAPUNTIIUM (Erinum)* caule patulo ramoso foliis lanceolatis subdentatis, pedunculis longissimis. *Rapuntium with a spreading branching stalk, spear-shaped leaves which are somewhat indented, and very long foot-stalks to the flowers.* *Campanula minor Africana, erini facie, flore violaceo, caulibus erectis.* H. L. 110. *Smaller African Bell-flower with the appearance of Erinus, a Violet flower, and an upright stalk.*

9. *RAPUNTIIUM (Erinoides)* caulibus procumbentibus, foliis lanceolatis serratis, pedunculis lateralibus. *Cardinal's-flower with trailing stalks, spear-shaped sawed leaves, and foot-stalks proceeding from their sides.* *Campanula minor Africana, erini facie, caulibus procumbentibus.* H. L. 108. *Smaller African Bell-flower with the appearance of Erinus, and trailing stalks.*

The first sort grows naturally by the side of rivers and ditches in great part of North America, but has been many years cultivated in the European gardens for the great beauty of its scarlet flowers. The root is composed of many white fleshy fibres; the lower leaves are oblong, a little sawed, and of a dark purplish colour on their upper side; the stalks are erect, and rise about a foot and a half high; they are garnished with spear-shaped leaves about three inches long, and one and a half broad in the middle, a little sawed on their edges, having very short foot-stalks, and are placed alternately; the stalk is terminated by a spike of flowers of an exceeding beautiful scarlet colour; these have a pretty long tube, which is a little incurved, but at the top is cut longitudinally into five segments; two upper, which are the smallest, are greatly reflexed, the three under which form the lower lip, are larger, and spread open. These appear the latter end of July and in August, when they make a fine appearance for a month or more, and when the autumn proves favourable, they will produce good seeds here.

This is propagated by seeds, which, when they ripen in England, should be sown in autumn in pots filled with rich kitchen-garden earth, and placed under a common hot-bed frame; or, if the seeds come from the country where the plants grow naturally, they should be sown in the same way as soon as they arrive, for if they are kept out of the ground till spring,

they will lie a year in the ground before they vegetate. The pots in which these seeds are sown should be exposed to the open air at all times when the weather is mild, but they must be screened from the frost, and the very hard rain in winter. In the spring the plants will appear, when they should have as much free air as possible in mild weather, and if the spring proves dry, they must be frequently refreshed with water. As soon as they are fit to remove, they should be each planted in a separate small pot filled with the same rich earth, and placed in the shade till they have taken new root; then they may be placed where they may have the morning sun, in which situation they may remain till autumn. During the summer, they must be duly watered in dry weather, and when the roots have filled the pots, they should be removed into larger. In autumn they must be placed under a common frame to screen them from hard frost, but they should enjoy the open air at all times when the weather is mild. The spring following they should be new potted, and placed where they may have the morning sun, always observing to water them duly in dry weather, which will cause their stalks to be stronger, and produce larger spikes of flowers in August. These will continue long in beauty, if they are not too much exposed to the sun, and, if the autumn proves warm, the seeds will ripen well in England. The roots of this plant will sometimes last two or three years, and produce offsets for increase, but they will not flower so strong as the seedling plants, therefore an annual supply of them should be raised. There are many who propagate this plant by cutting their stalks into proper lengths, and plant them in pots filled with good earth, or into an east border, covering them close with glasses. These frequently take root, so produce young plants, but they are not so good as the seedlings.

The plants of this sort will live in the full ground if they are protected from hard frost in winter, and they will flower stronger than those in pots.

The second sort grows naturally at Campeachy, from whence the late Mr. Robert Millar sent the seeds; this hath a fibrous root like the first. The stalks are much larger, and rise a foot higher; they are closely garnished with leaves which are above four inches long, and half an inch broad, very smooth and entire, ending in acute points; they are terminated by short spikes of flowers which are larger than those of the first sort, but are of the same beautiful scarlet colour, and appear about the same time with them.

This is propagated by seeds in the same way as the first, but the plants are not so hardy, therefore require to be placed in a moderate stove in winter, and in summer they should be placed in a deep frame, where they may be covered with glasses in bad weather, but enjoy the free air at all times when the weather is favourable. With this management the plants flowered very well in the Chelsea Garden, but they did not perfect seeds.

The third sort grows naturally in Virginia, but has been long an inhabitant of the English gardens; this hath a perennial fibrous root. The leaves are smooth, oval, spear-shaped, and a little indented on their edges; the stalks rise a foot and a half high, and are garnished with leaves like those at the bottom, which are gradually smaller to the top, sitting close to the stalk. The flowers come out from the wings of the leaves; they are of a pale blue colour, and have large empalements whose edges are reflexed; they appear a little earlier in July than the first sort, and the seeds frequently ripen in England.

It is propagated in the same way as the first sort, and the plants require the same culture.

The fourth sort grows naturally in Jamaica, from whence the late Dr. Houstoun sent the seeds; this is an annual plant. The stalk rises about a foot high, then divides into four or five smaller, which grow erect. The lower part is garnished with heart-shaped smooth leaves, about one inch and a half long, and three

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three quarters of an inch broad at the base, lessening to a point at the end; they have small indentures on their borders, and stand upon short foot-stalks. The upper slender stalks are thinly garnished with small purplish flowers to the top, and these are succeeded by small seed-vessels which ripen in autumn. When the seeds are permitted to scatter on the pots which stand near them, and those are sheltered from the frost, the plants will come up plentifully the following spring; or, if they are sown in pots in autumn, and sheltered in the winter, the plants will arise the following spring; and these should be transplanted into separate small pots, placing them under a frame, where they will flower in June and July, and their seeds will ripen in September, and the plants will then decay.

The fifth sort grows naturally in the forests about Blois in France; this is an annual plant. The root is composed of many fleshy fibres; the stalk rises about two feet high, and is garnished with spear-shaped leaves near three inches long, and one broad in the middle; they are very thin, and are sawed on their edges, sitting close to the stalk; the upper part of the stalk is garnished with very small leaves, and from their base arise the flowers, which are of a bright blue colour. These appear in July, and are succeeded by roundish seed-vessels with holes at the top, which are filled with small red seeds.

The seeds of this plant should be sown in autumn in pots filled with loamy earth, and placed under a hot-bed frame in winter, and when they come up in the spring, they should be transplanted either into a border of soft loamy earth, or into separate pots, shading them till they have taken new root; and afterward they must be duly watered in dry weather, which will cause them to flower strong, and produce good seeds annually.

The sixth sort grows naturally in North America; this is a biennial plant in England, which rarely flowers the same year as the plants come up, but decays soon after the seeds are ripe. The stalks of this are channelled and hairy; they grow erect to the height of two feet, and are garnished with thin oval leaves about two inches long, and one broad in the middle, sitting close to the stalk; they are of a light green, and a little sawed on their edges. The flowers stand upon long slender foot-stalks which come out from the wings of the leaves, and form a loose spike which terminate the stalk; they are small, and of a light blue colour. This flowers in July, and the seeds ripen in September. This is propagated by seeds, which should be sown in autumn, in pots filled with rich earth, and treated in the same way as the first sort.

The seventh sort grows naturally at the Cape of Good Hope; this is a biennial plant; the stalks rise a foot and a half high, they are covered with a hairy down, and are purplish toward the bottom; the leaves are oval, two inches and a half long, and an inch and a quarter broad, of a deep green colour, a little hairy on their under side, and sit close to the stalks. The flowers stand upon long slender foot-stalks, which come out from the bosom of the leaves, sometimes one proceeding from a joint, and at others they come out opposite on each side the stalk, each foot-stalk sustaining one pale blue flower, which being small makes but little appearance. This flowers about the same time with the former, and may be propagated in the same way.

The eighth sort grows naturally in moist places, on most of the islands in the West-Indies. This is also a biennial plant, whose root is composed of a few strong ligneous fibres, which strike deep in the ground; the stalk rises about eight or nine inches high, and is closely garnished with leaves on every side; these are four inches long and half an inch broad, very deeply indented on their edges; they are hairy, of a deep green, and sit close to the stalks. The flowers come out at every joint from the wings of the leaves, standing upon very short foot-stalks; the tube of the

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flower is from three to four inches long, very slender, and is deeply cut at the top into five segments, which spread open; they are white, and appear in June, and are succeeded by turgid seed-vessels, crowned by the five segments of the petal, having three holes at the top, and filled with small grayish seeds. The seeds of this sort should be sown soon after it is ripe, in pots filled with rich earth, and plunged into the tan-bed in the stove, observing to refresh the earth frequently with water. In the spring these pots may be removed, and plunged into a hot-bed, which will soon bring up the plants: when these are fit to remove, they should be each transplanted into a separate small pot filled with rich earth, and plunged into a fresh hot-bed, shading them from the sun till they have taken new root; then they may be treated in the same way as other tender plants from the same country, giving them a large share of air in warm weather, and frequently refreshing them with water. In autumn the plants must be plunged into the tan-bed of the stove, where they will flower the following summer and produce ripe seeds, soon after which the plants will decay. If the seeds of this plant are brought from the West-Indies, they should be sown as soon as they arrive, in pots filled with rich earth; and if it happens in the winter, the pots should be plunged into the tan-bed in the stove; but if it is in the spring or summer, they may be plunged into a hot-bed in the common frames. These seeds when sown in the spring, seldom grow the same year, therefore the following autumn the pots should be removed into the stove, and managed according to the above directions.

The ninth sort grows naturally at the Cape of Good Hope; this is an annual plant; the stalks are slender, branching, and spread out on every side; they rise about a foot high, and are garnished with small spear-shaped leaves which are indented on their edges, and sit close to the branches. The flowers are small and blue; they stand upon very slender long foot-stalks, and appear in July; these are succeeded by small roundish seed-vessels, filled with small seeds which ripen in September. If the seeds of this sort are sown in autumn, they will succeed much better than when they are sown in spring: these may be sown in pots, and sheltered under a common hot-bed frame in winter, exposing them to the open air at all times in mild weather, but screening them from the frost; and in the spring, the pots should be plunged into a moderate hot-bed, which will soon bring up the plants; when these are fit to remove, they should be each planted in a separate small pot filled with rich earth, and plunged into a moderate hot-bed again, shading them from the sun till they have taken new root; then they must have a large share of free air at all times when the weather is mild; and as the plants grow strong, they should be gradually hardened to bear the open air, into which they should be removed in June, placing them in a sheltered situation, where they will flower in July, and if the season proves favourable, the seeds will ripen in September; but if the season should prove cold, it will be proper to remove one or two plants into a glass-case, to obtain good seeds.

The tenth sort comes from the Cape of Good Hope: this hath trailing stalks, and the leaves are sawed on their edges, and the foot-stalks come out from the side of the branches, in which it differs from the last sort. It may be propagated by seeds, and treated in the same manner as the last.

RAUVOLFIA. Plum. Nov. Gen. 19. tab. 40. Lin. Gen. Plant. 259.

The name was given to this genus of plants by Father Plumier, who was the person that discovered it in America, in honour of Leonard Rauwolf, who was a curious botanist, and flourished about the year 1583. He travelled into the Holy Land, and several other places in the east, and published his travels in High Dutch, which were translated into English under the inspection of the great Mr. Ray.

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The CHARACTERS are,

The flower has a small permanent empalement of one leaf, cut into five segments at the top. The petal is funnel-shaped; the tube is cylindrical, globular at the base, and is cut at the brim into five parts. It has five stamina which are a little shorter than the tube, terminated by erect summits, and a roundish germen supporting a short style, crowned by a beaded stigma. The germen afterward becomes a globular berry with two cells, inclosing one compressed seed in each.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. RAUVOLFIA (*Canescens*) subpubescens. Lin. Sp. Plant. 303. *Hairy Rauwolfia.* Rauwolfia tetraphylla latifolia. Plum. Nov. Gen. 19. *Broad four-leaved Rauwolfia.*
2. RAUVOLFIA (*Nitida*) glaberrima nitidissima. Lin. Sp. 303. *Smooth neat Rauwolfia.* Rauwolfia tetraphylla angustifolia. Plum. Nov. Gen. 19. *Narrow four-leaved Rauwolfia.*

Both these sorts grow naturally in the warmest parts of America; Mr. Robert Millar sent the seeds of them from Carthagera in New Spain, where he observed the shrubs growing in great plenty. These rise with several ligneous stalks from the foot, which grow seven or eight feet high, sending out a few small side branches, covered with a smooth green bark when young, but as they are older their bark changes to a gray. The leaves are placed by fours at each joint round the branches; those of the first sort are two inches and a half long, and an inch and a half broad in the middle, a little hairy, of a light green, and have a few slight indentures on their edges; the leaves of the other sort are full as long, but are a third part narrower, of a thinner substance, and much smoother. These differences continue in the plants which are raised from seeds, for I have several times propagated them both from seeds, and have constantly found the seeds produce the same as the plants from which they were taken. The flowers are produced on slender foot-stalks, which arise from the wings of the leaves; they are tubulous, and globular at their base, and are succeeded by roundish berries about the size of those of the Privet, which turn black when they are ripe. These plants flower most part of the summer, and the fruit ripens in autumn and winter; the leaves and stalks of these plants have a milky juice, which flows out if they are broken.

These are propagated by seeds, which should be sown in autumn soon after they are ripe; for if they are kept out of the ground till spring, the plants rarely come up the same year; and this is frequently the case with those seeds which are brought to England.

The seeds of these plants should be sown in pots filled with fresh earth, and plunged into a hot-bed of tanners bark; for as they are very hard, so they frequently remain a long time in the ground; therefore when they are in pots, they may be shifted from one bed to another as their heat decays. When the plants come up, they must be frequently refreshed with water, but it must not be given them in large quantities; for as the plants are succulent and full of a milky juice, so they are in danger of rotting with too much moisture. They should also have a large share of fresh air admitted to them in warm weather, and when they are about two inches high, they should be transplanted each into a separate small pot filled with fresh light earth, and plunged into a hot-bed again, observing to shade them from the sun until they have taken new root; after which time they should have free air admitted to them every day, in proportion to the warmth of the season. In this hot-bed the plants may remain till toward Michaelmas, when they should be removed into the stove, and plunged into the tanners bark, where they must be kept warm, and not have too much moisture in cold weather.

As these plants are natives of very hot countries, they will not live in the open air in England, therefore

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they should constantly remain in the stove; and if they are continued in the bark-bed, they will thrive much faster than when they are placed on stands in a dry stove. But in the summer season they should have a large share of fresh air admitted to them, and the leaves of the plants must be now and then washed with a sponge, to clear them from the filth they are apt to contract; which, if suffered to remain, will retard the growth of the plants. Where due care is taken of them, they will thrive very fast, and the second year will produce flowers, and continue so to do for many years, and will perfect their seeds in England. They may also be propagated by cuttings, which should be laid to dry for two or three days before they are planted; and then should be plunged into a moderate hot-bed of tanners bark, observing to shade them until they have taken root, after which time they may be treated as the seedling plants.

RESEDA. Tourn. Inst. R. H. 423. tab. 238. Lin. Gen. Plant. 535. Bastard-rocket.

The CHARACTERS are,

The empalement of the flower is of one leaf, cut into several segments almost to the bottom, and is permanent. The petals of the flower are unequal, and generally trifid, having a honey gland on their base the length of the empalement. The honey glands are plain, erect, and produced from the upper side of the receptacle, between the stamina and the place of the upper petal, joining with the base of the petals, dilating from the sides. It hath fifteen or sixteen short stamina, terminated by erect obtuse summits; and a gibbous germen sitting upon very short styles, crowned by a single stigma. The germen afterward becomes a gibbous angular capsule of one cell, with an aperture between the styles, filled with kidney-shaped seeds fastened to the angles of the capsule.

This genus of plants is ranged in the third section of Linnæus's eleventh class, which includes those plants whose flowers have from eleven to nineteen stamina, and three styles.

The SPECIES are,

1. RESEDA (*Vulgaris*) foliis pinnatis, foliolis integris alternis floribus tetragynis. Bastard-rocket with winged leaves, whose lobes are entire, placed alternate, and have four styles to the flower. Reseda vulgaris. C. B. P. 100. Common Bastard-rocket.
2. RESEDA (*Crispa*) foliis omnibus trifidis, inferioribus pinnatis. Hort. Cliff. 213. Bastard-rocket with all the leaves trifid, and the lower ones winged. Reseda crispa Gallica. Bocc. Sic. 77. French curled Bastard-rocket.
3. RESEDA (*Phyteuma*) foliis integris trilobisque, calycibus sexpartitis maximis. Hort. Cliff. 412. Bastard-rocket with entire and trifid leaves, and the largest empalement to the flower. Reseda minor vulgaris. Tourn. Inst. R. H. 413. Lesser common Bastard-rocket.
4. RESEDA (*Undata*) floribus trigynis, tetragynisque calycibus quinquepartitis, foliis pinnatis undulatis. Lin. Sp. Plant. 644. Bastard-rocket with trifid and quadrifid flowers, whose empalements are cut into five parts, and winged waved leaves. Reseda minor alba, dentatis foliis. Barrel. Icon. 588. Smaller white Bastard-rocket with indented leaves.
5. RESEDA (*Alba*) foliis pinnatis, floribus tetragynis, calycibus sexpartitis. Lin. Sp. Plant. 645. Hort. Upsal. 149. Bastard-rocket with winged leaves, flowers having four styles, and an empalement cut into six parts. Reseda foliis calcitrapæ flore albo. Mor. Hort. R. Bl. Bastard-rocket with Star Thistle leaves, and a white flower.
6. RESEDA (*Odorata*) foliis integris trilobisque, calycibus florum æquantibus. Lin. Sp. Plant. 646. Bastard-rocket with entire three-lobed leaves, whose empalement is equal with the petals of the flower, commonly called sweet Reseda, or Mignonette d'Egypt.
7. RESEDA (*Canescens*) foliis subulatis sparsis. Sauv. Monsp. 41. Bastard-rocket with awl-shaped leaves placed thinly. Sesamoides flore albo, foliis canescentibus. Tourn. Inst. R. H. 424. Bastard Sesamum with a white flower and hoary leaves.
8. RESEDA (*Luteola*) foliis lanceolatis integris, calycibus quadrifidis. Lin. Sp. Plant. 448. Bastard-rocket with spear-shaped entire leaves, and quadrifid empalements. Luteola

teola herba falicis folio. C. B. P. 100. *Dyer's Weed*, or *wild Woad*, by some called *Weld*.

The first sort grows naturally in the south of France, Italy, and Spain. This is a biennial plant, which flowers and seeds the second year, and perishes soon after. The root is long, white, and a little ligneous; the leaves are unequally winged, and the lobes are entire; the stalks are channelled, rising two feet high, garnished with leaves like those below, but are smaller, and are terminated by long loose spikes of pale yellow flowers, composed of several unequal petals; the two upper are the largest, the side ones less, and the lower are so small as to be scarce conspicuous; they are all of a singular figure, and appear as if one leaf came out of two others. In the middle are situated many stamina terminated by yellow summits, and at the bottom a three-cornered germen, which afterward turns to a three-cornered seed-vessel, having three or four holes at the top, and filled with black seeds.

The second sort grows naturally in chalky land in many parts of England, and has been supposed to be the common sort, it being our common sort in England, but the former is more common abroad, and is so titled; the lower leaves of this are winged, and every lobe is cut into three small parts, and are curled, having some small indentures on their edges. The stalks rise about the same height as those of the former, and are terminated by longer and looser spikes of flowers; the flowers are paler and approach to a white. This flowers in June, and the seeds ripen in September.

The third sort grows naturally in the south of France and Italy; this is an annual plant, which has generally a single fleshy tap-root running deep in the ground, sending out several trailing stalks near a foot long, which divide into smaller branches, garnished with small leaves, some of which are wedge-shaped and entire, others are cut into three obtuse segments. The ends of the branches are terminated by loose spikes of flowers, standing upon pretty long foot-stalks. The empalement of the flower is large, divided into six segments almost to the bottom; the flowers are white, and shaped like those of the other sorts. It flowers in July, and the seeds ripen in autumn.

The fourth sort grows naturally in Italy and Spain; this is a biennial plant, the lower leaves are unequally winged, some of the intermediate lobes or segments being much less than the others, and of different shapes. The stalks rise two feet and a half high, garnished with smaller difformed winged leaves, indented on their edges. The flowers are produced in slender loose spikes at the top of the stalks; they are small and white, of the same shape with the others, appearing in June, and the seeds ripen in September.

The fifth sort grows naturally in the south of France; it is a biennial plant; the lower leaves are large, winged, and composed of many narrow lobes or segments placed alternate, which are of a grayish colour; the stalks rise two feet and a half high, and are garnished with the like leaves, which diminish in their size to the top; the stalks are terminated by shorter and thicker spikes of flowers than either of the former, which are white, and shaped like those of the other species. It flowers in June, and the seeds ripen in August.

The sixth sort is supposed to grow naturally in Egypt; the seeds of this were sent me by Dr. Adrian Van Royen, the late professor of botany at Leyden. The root of this plant is composed of many strong fibres, which run deep in the ground, from which come out several stalks about a foot long, which divide into many small branches; these are garnished with oblong leaves, some of which are entire, and others are divided into three parts; they are about two inches long, and three quarters of an inch broad in the middle, ending in oval points, of a deep green colour. The flowers are produced in loose spikes at the end of the branches; they stand upon pretty long foot-

stalks, have large empalements, and are of an herbaceous white colour, and smell very like fresh Raspberries, which occasions its being much cultivated in the English gardens. This plant is so like the third sort, as to be taken for the same by some, but the flowers of the third have no scent; so that those who have been imposed on, by having the seeds of the third sort sent them for this, have supposed the plant was degenerated.

The seventh sort grows naturally upon the mountains in Spain; this hath a perennial root, from which arise a few slender ligneous stalks a foot and a half high, which are thinly garnished with linear obtuse leaves, of a grayish colour; the upper part of the stalk is garnished for a good length with small, whitish, purple flowers, ranged in a very loose spike, sitting close to the stalk. These appear the latter end of May, and the seeds ripen in August.

The eighth sort grows naturally upon dry banks and old walls in many parts of England, but is cultivated in some places for the dyer's use. This is now generally believed to be the plant, with which the ancient inhabitants of this island painted themselves, and not the Woad, as has been by some supposed; for the Dyer's Weed is a native here, whereas the Woad has been since introduced into this country. This is a biennial plant; the root is composed of a few ligneous fibres; the leaves are four inches long, and half an inch broad, entire, and ending in obtuse points; these the first year spread circularly near the ground, and have some gentle wavings on their edges; the stalks rise three feet high, and are garnished with leaves of the same shape with those at bottom. They are terminated by long loose spikes of yellowish flowers, which appear the latter end of June, and the seeds ripen in September.

The five sorts first mentioned, and also the seventh, are seldom cultivated in gardens except for the sake of variety, having very little beauty to recommend them, and being of no use; but whoever has a mind to have them, need only sow their seeds in autumn, and when the plants come up, if they are thinned and kept clean from weeds, it is all the culture they require; and if their seeds are permitted to scatter, the plants will come up in plenty, and sometimes become troublesome weeds.

The seeds of the sixth sort should be sown on a moderate hot-bed in March, and when the plants are strong enough to transplant, they should be pricked out upon another moderate hot-bed to bring them forward; but they should have a large share of air in warm weather, otherwise they will draw up weak. About the latter end of May the plants may be planted out, some into pots, to place near the apartments, and others into warm borders, where they may remain to flower and seed. For the plants which grow in the full ground, often produce more seeds than those which are in pots; but at the time when the seed-vessels begin to swell, the plants are frequently infested with green caterpillars, which, if they are not destroyed, will eat off all the seed-vessels.

If the seeds of this plant are sown on a bed of light earth in April, the plants will come up very well, and when they are not transplanted, will grow larger than those which are raised in the hot-bed, but they will not flower so early, and in cold seasons will scarce ripen their seeds. The plants may also be preserved through the winter in a green-house, where they will continue flowering most part of the year, but the second year they will not be so vigorous as the first.

The eighth sort is the Weld, which is accounted a rich commodity for dyeing; where this is cultivated, the seeds are commonly sown with Barley in the spring, and after the Barley is taken off the ground, the Weld begins to make some progress, and the next season is pulled up for use. This has been long practised, and it will be difficult to prevail on the cultivators of this plant to depart from their old customs;

but if any persons will follow the directions hereafter given, I can from experience promise them much better success.

As the Weld will grow upon very poor soil, yet the crop will be in proportion to the goodness of the land; for upon very poor ground, the plants will not rise more than a foot high, whereas upon good ground I have measured them upward of three feet, and the stalks, leaves, &c. have been in proportion; so that the better the soil is upon which it is sown, the greater will be the produce.

The best way to cultivate this plant, is to sow it without any other crop; if the ground is ready by the beginning or middle of August, that will be a good season; the land should be well ploughed and harrowed fine, but unless it is very poor, it will not require dung; when the ground is well harrowed and made fine, the seeds should be sown; one gallon of the seeds is sufficient to sow an acre of land, for they are small. If rain falls in a little time after the seeds are sown, it will bring up the plants, and in two months time they will be so far advanced as to be easily distinguished from the weeds; then they should be hoed in the like manner as Turneps, always observing to do it in dry weather, for then the weeds will soon die after they are cut up; at this time the plants may be left about six inches distance; if this is done in dry weather, and the work well performed, the plants will be clean from weeds till the spring; but as young weeds will come up in March, so if in dry weather the ground is hoed again, it may be performed at a small expence while the weeds are young, and then they will soon decay; and if after this there should be many more weeds appear, it will be proper to hoe it a third time, about the beginning of May, which will preserve the ground clean till the Weld is fit to pull. The best time to pull the Weld for use, is as soon as it begins to flower, though most people stay till the seeds are ripe, being unwilling to lose the seeds; but it is much better to sow a small piece of land with this seed, to remain for a produce of new seeds, than to let the whole stand for seed; because the plants which are permitted to stand so long will be much less worth for use, than the value of the seeds; besides, by drawing off the crop early, the ground may be sown with Wheat the same season; for the plants may be drawn up the latter end of June, when they will be in the greatest vigour, so will afford a greater quantity of the dye.

When the plants are pulled, they may be set up in small handfuls to dry in the field, and when it is dry enough, it may be tied up in bundles and housed dry, being careful to stack it loosely, that the air may pass between to prevent its fermenting.

That which is left for seeds should be pulled as soon as the seeds are ripe and set up to dry, and then beat out for use; for if the plants are left too long, the seeds will scatter. The usual price of the seed is ten shillings a bushel.

RHABBARUM. See RHEUM.

RHABBARUM MONACHORUM. See RUMEX.

RHAGADIOLUS. See LAPSANA.

RHAMNOIDES. See HIPPOPHAE.

RHAMNUS. Tourn. Inst. R. H. 593. tab. 366. Lin. Gen. Plant. 235. the Buckthorn; in French, *Nerprun*.

The CHARACTERS are,

It hath male and female flowers on different plants; these have no empalements according to some, nor petals according to others. The cover of the sexes is funnel-shaped, and cut into four parts at the top, which spread open. The male flowers have five stamina the length of the tube, terminated by small summits. The female flowers have a roundish germen, supporting a short style, crowned by a quadrifid stigma. The germen afterward becomes a roundish berry, inclosing four hard seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants

whose flowers have five stamina and one style; but according to his system, it should be placed in the first section of his twenty-second class; but as he has joined to this genus the Frangula, Paliurus, Alaternus, and Ziziphus of Tournefort, so to comprehend them all he has placed them in his fifth class, which had much better be kept separate.

The SPECIES are,

1. RHAMNUS (*Catharticus*) floribus axillaribus, foliis ovato-lanceolatis serratis nervosis. *Buckthorn with flowers proceeding from the sides of the branches, and oval, spear-shaped, sawed, veined leaves.* Rhamnus catharticus. C. B. P. 478. *Purging or common Buckthorn.*
2. RHAMNUS (*Minor*) floribus axillaribus, foliis ovatis acuminatis nervosis integerrimis. *Buckthorn with flowers proceeding from the sides of the branches, and oval, acute-pointed, entire leaves, having veins.* Rhamnus catharticus minor. C. B. P. 478. *Smaller purging or common Buckthorn, commonly called Dwarf Rhamnus.*
3. RHAMNUS (*Longifolia*) foliis lanceolatis, floribus axillaribus. *Buckthorn with spear-shaped leaves, and flowers growing from the sides of the stalks.* Rhamnus catharticus minor, folio longiori. Tourn. Inst. 593. *Smaller purging Buckthorn with a longer leaf.*
4. RHAMNUS (*Africana*) foliis cuneiformibus confertis perennantibus, floribus corymbosis alaribus. *Buckthorn with wedge-shaped evergreen leaves growing in clusters, and flowers growing in roundish bunches from the sides of the branches.* Rhamnus Afer, folio pruni longiore subrotundo, flore candicante, spinis longissimis. Boerh. Ind. alt. 212. *African Buckthorn with a longer roundish Plum leaf, a very white flower, and long spines.*

The first sort grows naturally in the hedges in many parts of England; it rises with a strong woody stalk to the height of twelve or fourteen feet, sending out many irregular branches; the young shoots have a smooth, grayish, brown bark, but the older branches have a darker and rougher bark, and are armed with a few short thorns. The leaves stand upon pretty long slender foot-stalks; they are of the oval spear-shape, about two inches and a half long, and one and a quarter broad, slightly sawed on their edges, of a dark green on their upper side, but of a pale or light green on their under, having a pretty strong midrib, and several veins proceeding from it, which diverge toward the sides, but meet again near the point of the leaf. The flowers come out in clusters from the side of the branches; those of the male have as many stamina as there are divisions in the petal; those of the female have a roundish germen, which afterward turns to a pulpy berry of a roundish form, inclosing four hard seeds. It flowers in June, and the berries ripen in autumn.

The berries of this are used in medicine; for with them there is a purging syrup made, called Syrupus à spina cervina, or syrup of Buckthorn; which is reckoned a good medicine to purge watery humours, and against the dropsy, jaundice, itch, and all manner of eruptions on the skin: of late years, the people who supply the market with these berries, have mixed several other sorts with them, so that when the syrup is made by persons who have not skill to distinguish the berries, it is often very bad; so that two ounces of the syrup of one shop will not purge so well as one from another, which has brought this medicine into disrepute with many persons. These berries may be easily known by examining their seeds, to see if there are four in each, and also by rubbing the juice upon white paper, which it will stain of a green colour.

From the juice of these berries is made a very fine green colour, called by the French Verd-de-veffie, which is much esteemed by the painters in miniature. The second sort grows naturally in the south of France; this is an humble shrub, seldom rising more than three feet high, sending out many irregular branches, covered with a dark brown bark, garnished with oval leaves ending in acute points; they are about three quarters of an inch long, and half an inch broad

broad in the widest part, which is near the base; they are of a yellowish green, and a thin consistence, having several veins diverging from the midrib toward the sides, which converge again toward the point. The flowers come out upon small curfons or spurs on the side of the branches, each standing upon a separate short foot-stalk; they are of a yellowish herbaceous colour, having short swelling tubes, and are cut into five acute segments at the top, which spread open; they appear in June, but are not succeeded by berries here.

Mr. Du Hamel de Monceaux, of the Royal Academy of Sciences at Paris, says, that the fruit of this species gathered green is the Grain d'Avignon, or Avignon berries, which are used in dyeing of yellow; but I have been assured by a gentleman of skill, who resided long in the south of France, that the Avignon berries were the fruit of the narrow-leaved Alaternus; and in order to be better satisfied of the truth, I gathered a quantity of the berries of the narrow-leaved Alaternus before they were full ripe, and carried them to two eminent dealers in this commodity, and asked them if they knew what these berries were; they both assured me, after making trial of them, that they were Avignon berries, and if I had a large quantity of them, they would purchase them all: therefore, as the Alaternus before-mentioned is one of the most common shrubs in the south of France, from whence the Avignon berries are brought, we may suppose Mr du Hamel has been ill informed.

The third sort grows naturally in Spain and Italy; this grows to a larger size than the second, but not so high as the first. The branches are stronger, and are armed with a few long spines; the leaves are like those of the wild Plum, but are a little longer and narrower; the flowers are small, of a yellowish colour, and are produced from the side of the branches; these appear in June, but are not succeeded by berries in this country.

The first sort is so common in the hedges in many parts of England, that it is seldom cultivated in gardens; this rises easily from seeds, if they are sown in autumn soon after the berries are ripe; but, if they are kept out of the ground till spring, the plants will not come up till the year after; these will require no particular treatment, but may be managed in the same way as young Crabs, or any other hardy deciduous tree; it may also be propagated by cuttings or layers. If the young shoots are layed in autumn, they will put out roots by the following autumn, when they may be taken off from the plants, and either planted in a nursery to remain there to get strength for a year or two, or they may be planted where they are designed to remain. This is not so proper for hedges as the Hawthorn or Crab, so those should be preferred to it. The second and third sorts are preserved in botanic gardens for the sake of variety; but as they are not beautiful, few persons cultivate them here, especially as these do not produce fruit in England. They may be propagated either by laying down the young branches in autumn, or by planting the cuttings in the spring, before the buds begin to swell. These will put out roots in the same manner as the common sort, and may be treated in the same way, for they are both hardy plants, and will thrive in the open air. The fourth sort grows naturally at the Cape of Good Hope, so is too tender to thrive in the open air in England; but if it is placed in a common green-house with Myrtles, Olives, and the hardier kinds of exotic plants in winter, and removed to the open air in summer, it will thrive very well. This rises with a shrubby stalk to the height of four or five feet, sending out many side branches, which, when young, are covered with a green bark, but as they advance, the bark changes to a dark brown; they are armed with a few long slender thorns, and garnished with wedge-shaped leaves, which come out in clusters at each joint, four, five, or six rising from the same point, which differ in size, the largest being about an inch long, and three quarters broad, and the smallest about

half as large; they are of a deep green, and continue all the year; their points are broad and rounded, growing narrower to their base, sitting close to the branches. The flowers are produced on the side of the branches at each joint; they are collected into roundish bunches, standing upon foot-stalks an inch long; they are white, and have short tubes; their upper part is cut into five acute segments, which spread open in form of a star. These appear in June, at which time the whole shrub seems covered with flowers, so as to make a fine appearance; and as the leaves continue green all the year, it deserves a place where there is a conveniency to shelter them in winter. This sort has not as yet produced seeds in England, but it may be easily propagated by cuttings, which should be planted in pots filled with loamy earth the beginning of April. The pots should be plunged into a moderate hot-bed, and the cuttings should be shaded from the sun in the heat of the day; they must also be sprinkled with water two or three times a week, according as the earth in the pot dries, but they must by no means have too much wet. These cuttings will put out roots in two months, and soon after will begin to make shoots at the top; then they must have a large share of air admitted to them, and gradually inured to bear the open air, into which they should be soon after removed; and when they are well hardened, they may be shaken out of the pots, and separated, being careful to preserve a ball of earth to each, and plant them into single pots filled with soft loamy earth, placing them in the shade till they have taken new root; then they may be removed into a sheltered situation, where they may remain till the frost comes on in autumn, at which time they must be housed, and treated in the same way as the other hardier kinds of green-house plants.

RHEUM. Lin. Gen. Plant. 454. Rhabarbarum. Tourn. Inst. R. H. 89. tab. 18. The Rhubarb.

The CHARACTERS are,

The flower has no empalement; it hath one petal, which is narrow at the base, and impervious. The brim is cut into six parts, which are obtuse and alternately smaller; it hath nine hair-like stamina inserted in the petal, and is of the same length, terminated by oblong twin summits which are obtuse, and a short three-cornered germen, with scarce any style, crowned by three feathered stigmas which are reflexed. The germen afterward becomes a large three-cornered seed, with acute membranaceous borders.

This genus of plants is ranged in the second section of Linnæus's ninth class, which contains those plants whose flowers have nine stamina or stigmas, and three styles.

The SPECIES are,

1. RHEUM (*Rhaponticum*) foliis cordatis glabris spicis obtusis. Rhubarb with smooth heart-shaped leaves, and obtuse spikes of flowers. Rhaponticum. Prof. Alp. Exot. 187. *The Rhapontick, commonly called English Rhubarb.*
2. RHEUM (*Undulatum*) foliis subvillosis undulatis petiolis æqualibus. Lin. Diff. 1. tab. 1. Sp. Plant. 372. Rhubarb with hairy waved leaves, having equal foot-stalks. Rhabarbarum folio longiori hirsuto crispo, florum thyrsis longiori & tenuiori. Amman. Ruth. 9. Rhubarb with a longer hairy curled leaf, and a longer and slender spike of flowers.
3. RHEUM (*Compactum*) foliis cordatis glabris, marginibus sinuatis, spicis erectis compactis. Tab. 218. Rhubarb with heart-shaped smooth leaves, which are sinuated on their borders, and erect compact spikes of flowers.
4. RHEUM (*Palmatum*) foliis palmatis acuminatis. Lin. Sp. 531. Rhubarb with pointed hand-shaped leaves.
5. RHEUM (*Ribes*) foliis granulatis, petiolis æqualibus. Lin. Sp. Plant. 372. Rhubarb with granulated leaves having equal foot-stalks. Lapathum Orientale aspero & verrucoso folio, Ribes Arabium dictum. Hort. Elth. 191. tab. 158. Eastern Dock with a rough warted leaf, called by the Arabians Ribes.

The first sort grows naturally near the Pontic Sea, but has been long an inhabitant of the English gardens. When the seeds were first brought to Europe, they were supposed to be of the true Rhubarb, but upon

upon making trial of the roots, they were found to be greatly inferior to those of the true Rhubarb, and upon farther trials and examination, it was found to be the Rhapsontick of Prosper Alpinus, commonly called Pontick Rhubarb. This hath a large thick root, which divides into many strong fleshy fangs, running deep in the ground; the outside is of a reddish brown colour, and the inside yellow, from which arise several leaves, in number according to the size of the root; these come up folded in the spring, and afterward expand themselves; they are smooth, of a roundish heart-shape, having very thick foot-stalks of a reddish colour, which are a little channelled on their lower part, but flat at the top. When the plant grows in rich land, the foot-stalks of the leaves are near two feet long, and thicker than a man's thumb; the leaves also are often two feet long, and as much in breadth, having several strong longitudinal veins running from the foot-stalk to the borders, of a deep green, and are waved on their edges, having an acid taste, but particularly the foot-stalks, which are now frequently used for making tarts. From between the leaves arise the flower-stem, which is of a purple colour, garnished with one leaf at each joint, of the same shape with those below, but smaller, and sit close to the stalk. The stalks grow from two to three feet high, according to the strength of the ground, and are terminated by thick, close, obtuse spikes of white flowers, which appear the beginning of June, and are succeeded by large, triangular, brown seeds, having a border or wing at each angle, which ripen in August.

The seeds of the second sort were sent me from Leyden by the late Dr. Boerhaave, by the title of *Rhabarbarum Chinense verum*, or true China Rhubarb, which succeeded in the Chelsea Garden. The root of this sort divides into a number of thick fibres, which run deeper into the ground than those of the first, and are of a deeper yellow within. The leaves appear much earlier in the spring; the foot-stalks are not so much channelled on their under side, and are plain on their upper, not so red nor so thick as those. The leaves are longer, running more to a point, and are much waved on their edges, a little hairy on their upper side, and have many strong veins or ribs on their under. The flower-stem is of a pale brownish colour, rising about four feet high, dividing into several loose panicles or bunches of white flowers, which appear in May, and are succeeded by triangular seeds like those of the first sort, which ripen earlier in the season.

The seeds of the third sort were sent me from Petersburg, for the true Tartarian Rhubarb. The roots of this sort are large, and divide into many fangs; they are yellow within; the leaves appear early in the spring; the foot-stalks of these are of a pale green, and almost as large as those of the first sort; they have scarce any channels, and flat on their upper side; the leaves are smooth, heart-shaped, and do not run out to so great length in a point as those of the second, but are longer than those of the first; they are very broad toward their base, and have very large pale green ribs on their under side, a little waved on their edges, having a sharp acid flavour. The flower-stalk is of a pale green; it rises five or six feet high, and are as large as a common walking cane, garnished at each joint by one leaf of the same shape with those below, but smaller, sitting close to the stalk; the upper part of the stalk divides into small branches, each sustaining a panicle or spike of white flowers standing erect, which appear the latter end of May, and are succeeded by large triangular bordered seeds, like those of the first sort.

The roots of this last approach nearer to those of the foreign Rhubarb than either of the other, both in shape and quality; and as these seeds which were sent to Petersburg, were gathered from the plants growing on the spot where the Rhubarb is taken up, so there is little reason to doubt of its being the true sort, though the roots which have grown in Eng-

land have not been equal in quality with those of the foreign; but this may have been occasioned for want of age, or by being taken out of the ground at an improper season, therefore farther trials may improve it; and as the plants produce great plenty of seeds here, so they may be propagated with great ease. Dr. Linnæus seemed first to think the second sort was the true Rhubarb, but the roots of that which have grown here are very little better than those of the Rhapsontick, and I have reason to doubt if it is not a variety of it; for it is certain, these plants when growing near each other, are impregnated by each other's farina; for from the seeds of the Rhapsontick, which grew close to the second sort, I had a mixture of plants of both sorts produced, though the plant of the second sort did not produce any seeds, for the stalk decayed soon after the flowers faded; and the seeds of the Rhapsontick were gathered by myself from one plant, and were sown in his Grace the Duke of Bedford's garden at Wooburn Abbey, where there had not been any of these plants before growing, so that there could be no mixture of seeds, and yet a third part of the plants proved to be of the second sort.

It has been learnedly controverted by the botanists, whether the Rhapsontick of the ancients, and the Rhubarb of the moderns, is one and the same plant, some affirming, and others denying that there is any agreement; the reasonings on both sides may be seen in the Appendix to the second volume of John Bauhin's History of Plants.

The seeds of the fourth sort have been lately brought to England, from which many plants have been raised; these greatly differ in the form of their leaves from all the other species, for they are deeply cut into many acute segments, which spread open in form of a hand; and I am informed by a skilful botanist, who has seen this sort in flower, that it should be placed in the genus of *Rumex*, for there are but six stamina in each flower; but as the plant in the Chelsea Garden has not as yet flowered, nor have I seen any plants in that state, so I cannot take upon me to determine this.

However, I find the celebrated Linnæus now supposes this to be the true Rhubarb, which farther experiments must settle.

The fifth sort grows naturally on Mount Libanus, and other mountainous parts of Syria. This hath a thick fleshy root, which runs pretty deep in the ground, from which arise several leaves in the spring, which come up folded together, and afterward expand; they have very short foot-stalks, so spread near the ground; but during the spring, their borders are erect, and form a sort of hood having several folds, and are curled and waved on their edges; they are of a purplish green, and have purple veins and borders; their surface appears studded with rough protuberances, and when the leaves are fully expanded in summer, they are a foot long, and above two feet broad; their under side is paler than the upper, and their borders appear fringed. I have not seen this plant in flower, but the seeds of it were brought from Mount Libanus, by the Right Rev. Dr. Pocock, the late Bishop of Ossory; these were larger than those of the other species, and covered with a succulent pulp, of a deep red colour, and very astringent taste; this succulent covering may have occasioned its being taken for a berry, by many of the old writers; the shape of the seed is like that of the other species.

These plants are all propagated by seeds, which should be sown in autumn soon after they are ripe, and then the plants will come up the following spring; but if they are kept out of the ground till spring, the plants seldom come up till the next spring, so that a whole year will be lost. The seeds should be sown where the plants are designed to remain; for as their roots are large and fleshy, so when they are transplanted, they do not recover their removal soon; nor will the roots of those plants which are transplanted, ever grow so large and fair, as those which remain where they

they were sown. When the plants appear in the spring, the ground should be hoed over to cut up the weeds; and where the plants are too close, some should be cut up, to allow room for the others to grow, in the same manner as is practised for Carrots and Parsneps, leaving them at the first time of hoeing six or eight inches asunder, for fear of accidents; but at the second time of hoeing they may be separated to a foot and a half distance, or more. After this, the plants will require no other culture but to keep them clean from weeds, so that as soon as the weeds appear, if the ground is scuffled over with a Dutch hoe in dry weather, it may be done for a small expence, and thereby the ground will be kept clean. If this is begun early in the spring before the weeds are large, they will soon die, and by repeating it two or three times at proper intervals, during the spring, the ground will be made clean; and when the plants spread out their leaves to cover the ground, they will prevent the growth of weeds.

In autumn the leaves of these plants decay, then the ground should be made clean, and in the spring, before the plants begin to put up their new leaves, the ground should be either digged between the plants, or be hoed and made clean again; the second year after the plants come up, many of the strongest will produce flowers and seeds, but the third year most of them will flower. The seeds of these should be carefully gathered when ripe, and not permitted to scatter, lest they should grow to injure the old plants. The roots of these plants will remain many years without decaying; and I am informed, that the old roots of the true Rhubarb are much preferable to the young ones. They delight in a rich soil, not too dry, nor over moist; and where there is a good depth for their roots to run down in such land, their leaves will be very large, and their roots will grow to a great size.

The first sort is now frequently cultivated in gardens for the foot-stalks of their leaves, which are peeled and made into tarts in the spring: it is also kept in gardens, to supply the shops with the roots, which are used in medicine.

The true Rhubarb is now sown in many gardens, and may probably succeed so well here in time, as that a sufficient quantity of that valuable drug may be raised, to supply our consumption.

RHEXIA. Gron. Flor. Virg. 41. Lin. Gen. Plant. 423.

The CHARACTERS are,

The empalement of the flower is permanent, oblong, tubulous, and of one leaf, swelling below, but divided into four parts at the brim. The flower has four roundish petals inserted in the empalement, which spread open. It hath eight slender stamina which are inserted in the empalement, terminated by declining furrowed summits, which are narrow, obtuse, and moveable. It has a roundish germen, supporting a declining style the length of the stamina, crowned by a thick oblong stigma. The germen afterward becomes a roundish capsule with four cells in the swollen empalement, opening with four valves, and filled with roundish seeds.

This genus of plants is ranged in the first section of Linnæus's eighth class, which includes those plants whose flowers have eight stamina and one style.

The SPECIES are,

1. RHEXIA (*Virginica*) foliis sessilibus serratis calycibus glabris. Flor. Virg. 41. *Rhexia with smooth empalements, and sawed leaves sitting close to the stalks.* Lyfimachia non papposa Virginiana, tuberariæ foliis hirsutis, flore tetrapetalo rubello. Pluk. Phyt. tab. 202. f. 8. *Virginian Loosestrife without down, having a hairy leaf like Tuberaria, with a red flower having four petals.*
2. RHEXIA (*Mariana*) foliis ciliatis. Lin. Sp. Plant. 346. *Rhexia with fine hairy leaves.* Lyfimachia non papposa, terræ Marianæ, leptoneuros, flore trepetalo rubello, folio & caule hirsutis ferruginea hispida. Pluk. Phyt. 428. f. 1. *Loosestrife of Maryland having no down, but a reddish flower with four petals, and a leaf and stalk covered with iron-coloured hairs.*

The first sort was discovered by Mr. Banister in Vir-

ginia, from whence he sent the seeds to England, which succeeded in several gardens. This rises with an erect stalk near a foot and a half high, which is four cornered and hairy, garnished with spear-shaped hairy leaves about two inches long, and half an inch broad, which are entire, and placed opposite. The stalk has two foot-stalks coming out from the side opposite at the upper joint, and is terminated by two other; these each sustain two or three red flowers with heart-shaped petals, which spread open in form of a cross. These appear in June, but I have not seen any seeds produced here.

The second sort grows naturally in Maryland, from whence I received the seeds. This sends up an erect stalk about ten inches high, garnished with spear-shaped leaves about an inch long, and a third part of an inch broad, set on by pairs; and from every joint of the stalk comes out two short shoots opposite, garnished with small leaves of the same shape as the other; the whole plant is thick, set with stinging iron-coloured hairs. The stalk divides at the top into two foot-stalks, spreading from each other, having one reddish flower on each; these have four heart-shaped petals, which spread open like the other. It flowers about the same time as the first, but seldom produces seeds here. These plants are propagated by seeds, which must be procured from the places where they grow naturally. If the seeds arrive before the spring, and are sown soon after they arrive in pots filled with good fresh earth, and placed under a garden frame to guard them from frost, the plants will come up the following spring; but when the seeds are sown in the spring, the plants rarely come up the first year. When the plants come up and are fit to remove, part of them should be planted in an east border, where they may have only the morning sun, and the others may be planted into pots, that they may be sheltered under a frame in winter, for they are often destroyed by severe frost, though they will live abroad in the common winters very well; the second year the plants will flower, and with care they may be continued three or four years.

RHINANTHUS. Lin. Gen. Plant. 658. Pedicularis species. Tourn. Inst. 171. Elephas. Tourn. Cor. 48. tab. 482. Rattle, or Lousewort.

The CHARACTERS are,

The flower hath a permanent empalement of one leaf, which is roundish, compressed, and blown up. It hath one ringent petal, with a cylindrical tube the length of the empalement, compressed at the base, but opening at the top. The upper lip is hooded, compressed, and indented at the point; the lower lip is plain, spreading, and cut into three obtuse segments at the point. It has four stamina, which are shut up in the upper lip, two of which are shorter than the other, terminated by hairy incumbent summits, and an oval compressed germen supporting a slender style, situated with the stamina, crowned by an inflexed obtuse stigma. The germen afterward turns to an oval compressed capsule with two cells, opening on the side, and filled with compressed seeds.

This genus of plants is ranged in the second section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two shorter stamina and the seeds are lodged in a capsule.

1. RHINANTHUS (*Crista galli*) corollarum labio superiore compresso, brevior. Flor. Lap. 248. *Rhinanthus with a shorter compressed upper lip.* Pedicularis pratensis lutea, vel crista galli. C. B. P. 163. *Yellow Meadow Lousewort, yellow Rattle, or Cock's-comb.*
2. RHINANTHUS (*Orientalis*) corollarum labio superiore subulato incurvo. Lin. Sp. Plant. 603. *Rhinanthus with an awl-shaped incurved upper lip.* Elephas Orientalis, flore magno, proboscide incurvâ. Tourn. Cor. 48. *Eastern Elephant's-head, with a large flower and an incurved trunk.*
3. RHINANTHUS (*Elephas*) corollarum labio superiore subulato erecto. Prod. Leyd. 298. *Rhinanthus with an erect awl-shaped upper lip.* Elephas Italica, flore magno, proboscide furrectâ. Tourn. Cor. 48. *Italian Elephant's-head, with a large flower and an erect trunk.*

The first sort is a common weed in most of the low pastures and meadows in many parts of England where it is one of the most troublesome weeds among the Grass, spreading itself over the whole ground, so that in many of the water meadows, there is more of this plant than Grass. It is an annual plant, which flowers the latter end of May, so that the seeds ripen by the time the Grass of these meadows is mowed, and the seeds scatter and fill the ground with young plants the following spring; therefore, in order to destroy it, the Grass should be cut as soon as the flowers of this plant appear.

It is well known, so requires no description; and as it is never cultivated, so it is mentioned chiefly to introduce the others: but here I must observe, that the Dutch carry on a trade with the seeds and seed-vessels of one species of this genus to Germany, whose seed-vessels appear very like those of this first sort, they call it *Semen Savadillos*; the use of it is to kill vermin of every sort, especially bugs; they boil a quantity of the seeds and capsules in common water, with which they wash their wainscots, bedsteads, &c. where any of these insects are lodged, and it effectually destroys them.

The second sort was discovered by Dr. Tournefort on the sides of the Black Sea, growing in a fat soil and shady situation. The flower being shaped like an Elephant's-head, induced Fabius Columna to give the title of *Elephas* to the third species, which he found growing naturally in the kingdom of Naples, and Tournefort after him established the genus with that title. The stalks of this rise a foot and a half high; they are hollow, four-cornered, and hairy, garnished with leaves placed opposite, having short foot-stalks; they are about two inches long, and half an inch broad, crenated on their edges, hairy, and veined. The upper part of the stalk is garnished with flowers growing opposite from the wings of the leaves; these have curved tubes, which divide into two lips; the under lip is an inch long, broad, and cut into three obtuse parts, the middle segment being the broadest; the upper lip is like a helmet, and is longer than the lower. The flower is yellow, with a spot of fillemort on the lower lip, and the upper lip has two red spots on the top; the flowers have an agreeable scent. The third sort grows naturally in the kingdom of Naples; this is much like the former sort, but the proboscis of the flower is erect, and the lower lip has no spot.

These plants despise culture, so are with great difficulty kept in gardens; they are biennial, so are only propagated by seeds; these should be sown soon after they are ripe, otherwise they will not succeed, nor will the plants bear removing, so they should be sown where they are to remain, which should be in a moist rich soil and a shady situation: when the plants come up, they must be thinned and kept clear from weeds, which is all the culture they require. If the seeds of these plants are permitted to scatter, the plants will come up better than those which are sown by hand, but they thrive best amongst Grass.

RHIZOPHORA. Lin. Gen. Plant. 524. Mangles. Plum. Nov. Gen. 13. tab. 15. This is called Mangrove by the inhabitants of the West-Indies; there are several species of this kind, which grow in salt-water rivers both in the East and West-Indies, but as they will not grow upon land, it is needless to enumerate them here.

RHODIOLA. Lin. Gen. Plant. 997. *Anacampseros*. Tourn. Inst. R. H. 264. Rose-root.

The CHARACTERS are,

It hath male and female flowers in different plants; the male flowers have an empalement of one leaf, which is cut into four or five segments almost to the bottom; they have four obtuse petals, which are much longer than the empalement, and four nectariums, which are erect and shorter than the empalement, with eight awl-shaped stamina which are longer than the petals, terminated by obtuse summits. They have four oblong acute germen without style or stigma, so are abortive. The female flowers have the same

empalement as the male; they have four obtuse permanent petals equal with the empalement, and four nectariums like the male; they have four oblong acute-pointed germen sitting upon an erect style, crowned by obtuse stigmas. The germen afterward become four horned capsules, compressed on their inner side, filled with roundish seeds.

This genus of plants is ranged in the seventh section of Linnæus's twenty-second class, which contains those plants whose male and female flowers are upon different plants, and the male flowers have eight stamina.

The SPECIES are,

1. **RHODIOLA** (*Rosea*) *staminibus corollâ duplo longioribus. Rose-root with stamina twice as long as the petals. Anacampseros radice rosam spirante major.* Tourn. Inst. R. H. 264. *Greater Orpine with a Rose-scented root.*
2. **RHODIOLA** (*Minor*) *staminibus corolla ferè æquantibus. Rose-root with stamina scarcely equalling the length of the petals. Anacampseros radice rosam spirante minor.* Tourn. Inst. R. H. 264. *Smaller Orpine with a Rose-scented root.*

The first sort grows naturally in the clefts of the rocks and rugged parts of the mountains of Wales, Yorkshire, and Westmoreland. This has a very thick fleshy root, which, when bruised or cut, sends out an odour like Roses; it has many heads, from whence in the spring come out thick succulent stalks like those of Orpine, about nine inches long, closely garnished with thick succulent leaves of a gray colour, which are an inch long, and half an inch broad, indented on their edges toward the top, and are placed alternately on every side the stalk. The stalk is terminated by a cluster of yellowish herbaceous flowers, which appear early in May; the male flowers have stamina twice the length of the petals. They have a very agreeable scent, but are not of long continuance.

The second sort grows naturally on the Alps; the roots of this are smaller than those of the other sort, the stalks are small, and not above five inches long; the leaves are small, but shaped like those of the other sort, and end with a purple point; the petals of the flowers are purplish, and the stamina are but little longer than the petals. This flowers later than the other sort. I have cultivated both these plants in the same soil above thirty years, and have never found either of them vary.

These plants are preserved in the gardens of the curious, for the sake of variety; they are easily propagated, either by cuttings or parting of the roots. If by cuttings, they should be planted the beginning of April, soon after they come out from the head; if these are planted in a shady border, and covered close down with a glass, keeping them dry, they will put out roots in about six weeks; but the cuttings should be laid in a dry room at least a week before they are planted, that the wounds may be dried before they are planted, otherwise they are subject to rot.

If they are propagated by parting of the roots, that should be performed in the beginning of September, at which time their stalks begin to decay; and if the fleshy parts of the roots are cut or broken, they should be laid to dry a few days before they are planted, for the same reason as the cuttings. These plants require a shady situation and a dry undunged soil, in which they will continue many years.

RHODODENDRON. Lin. Gen. Plant. 484. *Chamærhododendros.* Tourn. Inst. R. H. 604. tab. 373. Dwarf Rose-bay.

The CHARACTERS are,

The flower has a permanent empalement cut into five segments; the flower hath one wheel funnel-shaped petal, spreading open at the brim; it has ten slender stamina which decline, and are the length of the petals, terminated by oval summits, and a five-cornered germen, supporting a slender style the length of the petal, crowned by an obtuse stigma. The germen afterward becomes an oval capsule with five cells, filled with small seeds.

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This genus of plants is ranged in the first section of Linnæus's tenth class, which contains those plants whose flowers have ten stamina and one style.

The SPECIES are,

1. RHODODENDRON (*Hirsutum*) foliis ciliatis nudis, corollis infundibuliformibus. Lin. Sp. Plant. 292. *Rose-bay with naked hairy leaves, and funnel-shaped petals.* Chamærhododendros Alpina, villosa. Tourn. Inst. R. H. 604. *Hairy Alpine Dwarf Rose-bay.*
2. RHODODENDRON (*Ferrugineum*) foliis glabris, subtus leprosis, corollis infundibuliformibus. Lin. Sp. Plant. 392. *Rose-bay with smooth leaves which are hoary on their under side, and funnel-shaped petals.* Chamærhododendros Alpina glabra. Tourn. Inst. R. H. 604. *Smooth Alpine Dwarf Rose-bay.*

The first sort grows naturally on the Alps, and also upon several mountains in Italy. This is a low shrub, which seldom rises two feet high, sending out many short ligneous branches, covered with a light brown bark, and garnished closely with oval spear-shaped leaves about half an inch long, and a quarter of an inch broad, sitting pretty close to the branches; they are entire, and have a great number of fine iron-coloured hairs on their edges and under side. The flowers are produced in bunches at the end of the branches; they have one funnel-shaped petal; the tube is about half an inch long; the brim is cut into five obtuse segments, which spread half open; they are of a pale red colour, and have ten stamina in each, which are the length of the tube; after the flowers are past, the germen in the center turns to an oval capsule with five cells, filled with small seeds. It flowers in May, and the seeds ripen in August.

The second sort grows naturally on the Alps and Apennines; this rises with a shrubby stalk near three feet high, sending out many irregular branches, covered with a purplish bark, and closely garnished with smooth spear-shaped leaves an inch and a half long, and half an inch broad in the middle; they are entire, and their borders are reflexed backward; the upper side is of a light lucid green, and their under side of an iron colour; they are placed all round the branches without any order. The flowers are produced in round bunches at the end of the branches; they are funnel-shaped, having short tubes, which are cut into five obtuse segments at the brim, which spread a little open; they are of a pale Rose colour, and make a good appearance. This sort flowers in June, but does not ripen seeds here.

There are some other species of this genus which grow naturally in the eastern countries, and others are natives of America, but the two sorts here mentioned are all I have seen in the English gardens; and these are difficult to propagate and preserve in gardens, for they grow naturally upon barren rocky soils and in cold situations, where they are covered with snow great part of the winter; so that when they are planted in better ground, they do not thrive, and for want of their usual covering of snow in winter, they are frequently killed by frost; but could these plants be tamed, and propagated in plenty, they would be great ornaments to the gardens.

They are propagated by seeds, but these are so very small, that if they are covered deep, they will not grow. The seeds should be sown as soon as possible after they are ripe, either in shady borders or pots filled with fresh gentle loamy earth, and very lightly covered with a little fine earth; then the pots should be plunged up to their rims in a shady border, and in hard frost they should be covered with bell or hand-glasses, taking them off in mild weather. If these seeds are sown early in autumn, the plants will come up the following spring; these must be kept shaded from the sun, especially the first summer, and duly refreshed with water, and in autumn following, they may be transplanted to a shady situation and on a loamy soil, covering the ground about their roots with Moss, which will guard them from frost in winter, and keep the ground moist in summer.

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RHUS. Tourn. Inst. R. H. 611. tab. 381. Lin. Gen. Plant. 331. [*ῥήσ* takes its name from *ῥέω* to flow, because it stops dysenterical fluxes of the bowels.] Sumach.

The CHARACTERS are,

The empalement of the flower is permanent, erect, and cut into five parts. The flower has five oval, erect, spreading petals, and five short stamina terminated by small summits, shorter than the petals; it has a roundish germen as large as the petals, with scarce any style, crowned by three small stigmas. The germen afterward becomes a roundish hairy berry, inclosing a single hard seed of the same form.

This genus of plants is ranged in the third section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and three styles.

The SPECIES are,

1. RHUS (*Coriaria*) foliis pinnatis obtusiusculè ferratis, ovalibus subtus villosis. Lin. Sp. Plant. 379. *Sumach with winged leaves which are obtusely sawed, oval, and hairy on their under side.* Rhus folio ulmi. C. B. P. 414. *Elm-leaved Sumach.*
2. RHUS (*Typhinum*) foliis pinnatis lanceolatis, argute ferratis subtus tomentosis. Amœn. Acad. 4. p. 311. *Sumach with spear-shaped winged leaves which are sharply sawed, and woolly on their under side.* Rhus Virginianum. C. B. P. App. 517. *Virginian Sumach.*
3. RHUS (*Glabrum*) foliis pinnatis ferratis lanceolatis utrinque glabris. *Sumach with winged leaves which are spear-shaped, and smooth on both sides.* Rhus Virginicum, paniculâ sparsâ, ramis patulis glabris. Hort. Elth. 323. *Virginian Sumach with a loose panicle, and smooth spreading branches.*
4. RHUS (*Carolinianum*) foliis pinnatis ferratis lanceolatis, subtus incanis, paniculâ compactâ. *Sumach with sawed, spear shaped, winged leaves which are hoary on their under side, with a compact panicle.* Rhus Carolinianum, paniculâ speciosâ coccineâ. Catesb. Hist. Carol. *Carolina Sumach having a beautiful scarlet panicle.*
5. RHUS (*Canadense*) foliis pinnatis, obsoletè ferratis, lanceolatis, utrinque glabris, paniculâ compositâ. *Sumach with winged spear-shaped leaves which are slightly sawed, and a compound panicle.* Rhus Canadense folio longiori utrinque glabro. Tourn. Inst. R. H. 611. *Canada Sumach, with a longer leaf which is smooth on both sides.*
6. RHUS (*Copallinum*) foliis pinnatis integerrimis, petiolo membranaceo articulato. Flor. Leyd. Prod. 24. *Sumach with entire winged leaves, and a jointed membranaceous foot-stalk.* Rhus angustifolium. C. B. P. 414. *Narrow-leaved Sumach.*
7. RHUS (*Chinense*) foliis pinnatis, foliolis ovatis, obtusè ferratis, petiolo membranaceo villosis. *Sumach with winged stalks, oval lobes which are bluntly sawed, and a hairy foot-stalk having jointed membranes or wings.* Rhus Sinarum lactescens, costâ foliorum alata. Pluk. Am. 183. *China milky Sumach, with winged membranes to the leaves.*
8. RHUS (*Incanum*) foliis ternatis, foliolis ovatis subtus tomentosis. *Three-leaved Sumach, with oval leaves which are downy on their under side.* Rhus Africanum majus folio subrotundo integro, molli & incano. Pluk. Phyt. tab. 219. fig. 8. *Greater, three-leaved, African Sumach, with a rounder entire leaf which is soft and hoary.*
9. RHUS (*Tomentosum*) foliis ternatis foliolis subpetiolatis, rhombeis angulatis, subtus tomentosis. Lin. Sp. Plant. 266. *Three-leaved Sumach with angular rhomboid lobes having foot-stalks, and downy on their under side.* Rhus Africanum trifoliatum majus, foliis obtusis & incisus hirsutis pubescentibus. Pluk. Phyt. tab. 219. fig. 7. *Greater, African, three-leaved Sumach, with obtuse cut leaves which are covered with soft hairs.*
10. RHUS (*Lucidum*) foliis ternatis, foliolis sessilibus cuneiformibus lævibus. Vir. Cliff. 25. *Three-leaved Sumach whose lobes are smooth, wedge-shaped, and sit close to the stalk.* Rhus Africanum, trifoliatum minus glabrum, splendente folio, subrotundo integro. Pluk. Phyt. 219. fig. 9. *Three-leaved African Sumach, with a smooth, shining, roundish, entire leaf which is small.*

11. RHUS

11. RHUS (*Africanum*) foliis ternatis, foliolis ovatis nervosis, marginibus sæpius dentatis, utrinque viridibus. *Sumach with trifoliate leaves having oval veined lobes which are generally indented on their edges, and green on both sides.* Rhus Africanum, trifoliatum majus glabrum, splendente utrinque folio subrotundo medio quandoque crenato. Boerh. Ind. alt. 2. p. 229. *Greater, African, three-leaved Sumach, with smooth roundish leaves on both sides, which are sometimes crenated in the middle.*
12. RHUS (*Argenteum*) foliis ternatis, foliolis petiolatis lineari-lanceolatis integerrimis subtus tomentosis. Hort. Cliff. III. *Sumach with trifoliate leaves, whose lobes stand upon foot-stalks, are linear, spear-shaped, entire, and downy on their under side.* Rhus Africanum trifoliatum majus, foliis subtus argenteis acutis & margine incis. Pluk. Phyt. tab. 219. fig. 6. *Greater African three-leaved Sumach, with leaves which are silvery on their under side, and cut on their edges.*
13. RHUS (*Radælijawel*) foliis ternatis, foliolis ovatis acuminatis integerrimis, petiolatis, floribus paniculatis terminalibus. *Three-leaved Sumach, with oval acute-pointed lobes which are entire, upon foot-stalks growing in panicles which terminate the branches.* Phaseolus arborecens Zeylanicus monocarpus, Radælijawel. Herm. Mus. Zeyl. 39. *Tree Kidney-bean of Ceylon with a single fruit, called Radælijawel.*
14. RHUS (*Rigidum*) foliis ternatis linearibus integris rigidis glabris. *Sumach with three linear, entire, rigid, smooth leaves.*
15. RHUS (*Cotinus*) foliis simplicibus obovatis. Lin. Sp. Plant. 267. *Sumach with single, obverse, oval leaves.* Cotinus Coriaria. Dod. Pemp. 780. *Venice Sumach, or Coccygria.*

The first sort of Sumach grows naturally in Italy, Spain, and Turkey; the branches of this tree are used instead of Oak bark for tanning of leather, and I have been informed that the Turkey leather is all tanned with this shrub. It hath a strong ligneous stalk which divides into many irregular branches, which rise to the height of eight or ten feet; the bark is hairy, and of an herbaceous brown colour while young; the leaves are winged, and composed of seven or eight pair of lobes terminated by an odd one; the lobes are about two inches long, and half an inch wide in the middle; they are bluntly sawed on their edges, and hairy on their under side, of a yellowish green colour; they are placed alternately on the branches; the flowers grow in loose panicles at the end of the branches, which are of a whitish herbaceous colour, each panicle being composed of several close spikes of flowers sitting close to the foot-stalks; these appear in July, but are not succeeded by seeds in England. The leaves and seeds of this sort are used in medicine, and are esteemed very restraining and stiptick, and good for all kinds of fluxes and hæmorrhages; used both inwardly and outwardly, they resist putrefaction, and stop gangrenes and mortifications.

The second sort grows naturally in almost every part of North America; this hath a woody stem, from which are sent out many irregular branches, which are generally crooked and deformed. The young branches are covered with a soft velvet like down, resembling greatly that of a young stag's-horn both in colour and texture, from whence the common people have given it the appellation of Stag's-horn; the leaves are winged, composed of six or seven pair of oblong lobes, terminated by an odd one, ending in acute points; they are entire, and hairy on their under side, as is also the midrib. The flowers are produced in close tufts at the end of the branches, which are succeeded by seeds inclosed in purple, woolly, succulent covers, so that the bunches are of a beautiful purple colour in autumn, and the leaves before they fall, change also to a purplish colour first, and before they fall, to a feuilemort. This is used for tanning of leather in America, and the roots are often prescribed in medicine in the countries where the plant grows naturally.

The third sort grows naturally in many parts of North America; this is commonly titled by the gardeners New England Sumach. The stem of this sort is stronger, and rises higher than that of the former; the branches spread more horizontally; they are not quite so downy as those of the last, and the down is of a brownish colour; the leaves are composed of many more pair of lobes, which are smooth on both sides; the flowers are disposed in loose panicles, which are of an herbaceous colour; they appear about the same time with those of the former, but are not succeeded by seeds in England.

The fourth sort grows naturally in Carolina; the seeds of this were brought from thence by the late Mr. Catesby, who has given a figure of the plant in his Natural History of Carolina. This is by the gardeners called the scarlet Carolina Sumach; it rises commonly to the height of seven or eight feet, and divides into many irregular branches, which are smooth, of a purple colour, and pounced over with a grayish powder, as are also the foot-stalks of the leaves, which are of a purplish colour. The leaves are composed of seven or eight pair of lobes terminated by an odd one; these are not always placed exactly opposite on the midrib, but are sometimes alternate; they are three or four inches long, and almost one broad in the middle, ending in acute points, and are sawed on their edges. The upper side of the lobes are of a dark green, and their under hoary, but smooth. The flowers are produced at the end of the branches in very close thick panicles which are large, and of a bright red colour; they appear in July and August, and continue till autumn, but the seeds do not ripen in England.

The fifth sort grows naturally in Canada, Maryland, and several other parts of North America; this hath smooth branches, of a purple colour, covered with a gray pounce. The leaves are composed of seven or eight pair of lobes terminated by an odd one; the lobes are spear-shaped, four inches and a half long, and one broad in the middle, terminating in acute points, and are a little sawed on their edges; they are of a lucid green on their upper surface, but hoary on their under, and are smooth. The flowers are produced at the end of the branches in large panicles, which are composed of several smaller, each standing upon separate foot-stalks; they are of a deep red colour, and the whole panicle is covered with a gray pounce, as if it had been scattered over them. This sort flowers at the same time with the fourth, but does not ripen seeds here.

The sixth sort grows naturally in most parts of North America, where it is known by the title of Beech Sumach, probably from the places where it grows. This is of humbler growth than either of the former, seldom rising more than four or five feet high, dividing into many spreading branches which are smooth, of a light brown colour, and are pretty closely garnished with winged leaves; they are composed of four or five pair of narrow lobes terminated by an odd one; they are entire, about two inches long, and half an inch broad, ending in acute points; they are of a light green on both sides, and in autumn change purplish. The midrib which sustains the lobes, has on each side a winged or leafy border, which runs from one pair of lobes to another, ending in joints at each pair, by which it is easily distinguished from the other sorts. The flowers are produced in loose panicles at the end of the branches; they are of a yellowish herbaceous colour, and appear in July, but the seeds do not ripen in England.

These six sorts are hardy plants, and will thrive in the open air in England. The first and fourth sorts are not quite so hardy as the others, so must have a better situation, otherwise their branches will be injured by severe frost in the winter; they are easily propagated by seeds, when obtained from the countries where they grow, which, if sown in autumn, the plants will come up the following spring; but if they are sown in the spring, they seldom come up till the

the next spring; they may be either sown in pots, or the full ground. If they are sown in pots in autumn, the pots should be placed under a common frame in winter, where the seeds may be protected from hard frost, and, if in the spring the pots are plunged into a very moderate hot-bed, the plants will soon rise, and have thereby more time to get strength before winter. When the plants come up, they must have a large share of air, and should be gradually hardened to bear the open air, into which they should be removed as soon as the weather is favourable, placing them where they may have the morning sun, and must be kept clean from weeds; and in dry weather, if they are supplied with water, it will greatly promote their growth; but toward autumn it will be proper to stint their growth by keeping them dry, that the extremity of their shoots may harden; for if they are replete with moisture, the early frosts in autumn will pinch them, which will sometimes cause their shoots to decay almost to the bottom, if the plants are fully exposed. If the pots are put under a common frame again in autumn, it will secure the plants from injury, for while they are young, and the upper part of the shoots are soft, so they will be in danger of suffering if the winter proves very severe; but in mild weather they must always enjoy the open air, therefore should never be covered but in frost. The spring following, just before the plants begin to shoot, they should be shaken out of the pots, and carefully separated, so as not to tear the roots, and then transplanted into a nursery in rows three feet asunder, and about one foot distance in the rows. In this nursery they may stand two years to get strength, and then may be transplanted where they are to remain.

The seeds which are sown in the full ground, may be covered the first winter with some old tanners bark to keep out the frost, and in the spring it may be drawn off again after the danger of the hard frost is over; and when the plants come up, they must be kept clean from weeds, which is all the care they will require the first summer; but as the plants in the full ground are apt to grow luxuriant, and continue growing late in autumn, they should be covered to screen them from the early frost, which will otherwise kill their tops, and this often occasions them to die down a considerable length, and frequently almost to the ground in hard winters. In the spring following the plants may be taken up carefully, and transplanted into a nursery at the same distance as before directed. This method of propagating the plants from seeds is seldom practised after a person is once possessed of the plants, for they are very subject to send up a great number of suckers from their roots, whereby they are easily propagated. The suckers of all the sorts may be taken up and planted in a nursery for a year or two to get strength, and then may be planted where they are to remain.

These shrubs are generally planted in plantations of flowering shrubs in large gardens, where they make a fine variety in autumn, especially the second, fourth, and fifth sorts, with their large purple, or red panicles, which have a good effect; but where these are planted, their suckers must be every year taken off, otherwise they will grow up to a thicket and destroy the neighbouring plants.

The seventh sort grows naturally in the east. The seeds of this were sent to the Royal Garden at Paris, where they succeeded, and from thence I received the plant, which grew very well in the open air at Chelsea three years, but the severe winter in 1740 destroyed it, so that it is not quite so hardy as the other sorts. This rises with a shrubby stalk five or six feet high, sending out many irregular branches. The young shoots and foot-stalks of the leaves are covered with a soft brown hairy down; the leaves are composed of three or four pair of oval lobes terminated by an odd one; the inner lobes are small, and the outer large; the first are not more than an inch and a half long, and three quarters of an inch broad, but the

outer are more than two inches long, and an inch and a quarter broad; the end lobe is heart-shaped, ending in an acute point, and is three inches long and two broad at the base; they are sawed on their edges, and hoary on their under side; the midrib which sustains the lobes, has two leafy membranes running along the sides from joint to joint, which are narrow below, and gradually increase in their breadth to the next joint. When the leaves are broken, they emit a milky juice from the wound. As I have not seen the flowers of this sort, I can give no account of them.

This sort does not put out suckers from the root like the American kinds, so must either be propagated by layers, or by cutting off some of the roots, and planting them upon a gentle hot-bed in the spring, by which method there is great probability it may be propagated, but my plant was too weak for this purpose when it was destroyed.

The eighth sort grows naturally at the Cape of Good Hope; this hath a strong woody stalk which rises ten or twelve feet high, covered with a gray bark, sending out many smooth branches on every side, garnished with trifoliate leaves standing upon pretty long foot-stalks. The lobes of the leaves are oval and entire, about an inch long, and three quarters broad, hoary on their under side, but smooth and of a lucid green on their upper; the flowers are produced from the wings of the leaves in small panicles; they are of an herbaceous colour, and appear in July, but fall away in England without having any seeds succeed them.

The ninth sort also grows naturally at the Cape of Good Hope; this rises with a woody stalk to the height of seven or eight feet, covered with a brown bark, having many irregular branches, garnished with trifoliate leaves standing upon long foot-stalks. The lobes of this sort are angular, and shaped like a rhombus; they are near two inches long, and one broad, downy on their under side, but of a dark green on their upper. The flowers come out in slender bunches from the side of the branches; they are of a whitish herbaceous colour, and soon fall away.

The tenth sort grows naturally at the Cape of Good Hope; this rises with a woody stalk like the eighth, dividing into many branches covered with a brown bark, garnished with trifoliate leaves, whose lobes are wedge or heart-shaped, of a lucid green, and sit close to the foot-stalk. This sort does not flower here so far as I can find, for I have had some of the plants in my care almost forty years, but they have not flowered as yet.

The eleventh sort is a native of the Cape of Good Hope. This hath some resemblance of the former, but the lobes of the leaves are twice as large and oval, with some indentures on their edges; they have several transverse veins running from the midrib to the edges, and are very stiff, of a bright lucid green on both sides. This sort has not flowered here so far as I can learn.

The twelfth sort came from the Cape of Good Hope, where it grows naturally. This rises with a woody stalk seven or eight feet high, dividing into several irregular branches, which are covered with a dark brown bark, and garnished with narrow, spear-shaped, trifoliate leaves, standing upon pretty long foot-stalks. The lobes are two inches long, and half an inch broad in the middle, ending in acute points; they are downy on their under side, but of a lucid green on their upper. The flowers are produced in small loose bunches from the side of the branches; they are small, of an herbaceous colour, and fall off without having any seeds succeed them.

All these African sorts are too tender to live through the winter in the open air in England, so they are planted in pots or tubs, and housed in autumn, and during the winter they must be treated in the same way as other hardy green-house plants. They all retain their leaves through the year, so make a good variety when intermixed with other plants in the green-house in winter. They may be propagated by cut-

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tings, which should be planted in pots filled with loamy earth the beginning of April, and plunged into a very moderate hot-bed, covering them close with hand or bell-glasses, and screening them from the sun in the heat of the day. The cuttings should be now and then refreshed with water, but it should not be given in too great quantity. With this management they will put out roots in about two months, and when they begin to shoot, they should have air admitted to them, and be gradually hardened to bear the open air, into which they must be removed, placing them in a sheltered situation; and when the cuttings have filled the pots with their roots, they should be shaken out of the pots, and parted carefully, planting each into a separate small pot, placing them in the shade till they have taken new root, when they may be intermixed with other exotic plants in a sheltered situation for the summer, and in autumn removed into the green-house.

The thirteenth sort grows naturally on the Island of Ceylon; this rises with a woody stalk ten or twelve feet high, sending out many branches, which are cloathed with trifoliate leaves, standing upon pretty long foot-stalks. The lobes of the leaves are oval, about two inches long, and an inch and a half broad, terminating in acute points; they are thick, smooth, and of a lucid green. The flowers are produced in loose panicles at the end of the branches; they are of a whitish herbaceous colour, and small. They seldom appear in England, but when they do they are not succeeded by seeds here.

This plant is tender, so must be placed in a moderate stove, otherwise it will not live through the winter in England. It may be propagated by cuttings in the same way as the former sorts, but requires a warmer bed than those to promote their putting out roots. When they have good roots they should be each transplanted into a separate small pot, and plunged into the tan-bed, and treated in the same way as other tender exotic plants.

The fourteenth sort is a native of the Cape of Good Hope, where it grows to be a large shrub, but in England it seldom rises more than five or six feet high, sending out many branches covered with a bright brown bark, garnished with very narrow trifoliate leaves, standing on very long foot-stalks; the flowers come out in loose panicles at the ends of the branches, and also from the wings of the stalks, of an herbaceous colour, but are small, and fall away, without producing seeds in England.

This may be propagated by cuttings, which should be planted in pots during the summer season, plunging them into a moderate hot-bed, covering them close with hand-glasses; when they have taken root, they should be each planted in a separate pot, shading them till they have taken new root, and in the autumn they must be removed to a green-house.

The fifteenth sort grows naturally in Spain, Italy, and the Levant, where the leaves and branches are used for tanning of leather; this rises with an irregular shrubby stalk to the height of ten or twelve feet, sending out many spreading branches covered with a smooth brown bark, garnished with single, obverse, oval leaves about two inches long, and of the same breadth, rounded at their points, and stand upon long foot-stalks; they are smooth, stiff, and of a lucid green, having a strong midrib, from whence several transverse veins run toward the border. The flowers come out at the end of the branches upon long hair-like foot-stalks, which divide, and branch into large hair-like bunches of a purplish colour; they are small, white, and composed of five small oval petals which spread open; these appear in July, but are not succeeded by seeds in England.

This plant is cultivated for sale in the nursery-gardens near London; it is propagated by layers, which should be laid down in the autumn, and by next autumn they will have taken root, when they may be taken off from the old plants, and transplanted in a nursery, where they may grow a year or two to get

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strength, and then be planted where they are to remain. This shrub is so hardy as to be seldom injured by frost in England.

RIBES. Lin. Gen. Plant. 247. Grossularia. Tourn. Inst. 639. tab. 409. Ribesium. Dill. H. Elth. 246. The Currant-tree.

The CHARACTERS are,

The flower has a bellied empalement of one leaf, cut at the top into five concave obtuse segments; it hath five small, obtuse, erect petals growing to the border of the empalement, and five awl-shaped stamina inserted in the empalement, terminated by incumbent compressed summits opening at their border. The roundish germen is situated under the flower, supporting a bifid style, crowned by obtuse stigmas; it afterward becomes a globular umbilicated fruit with one cell, containing many roundish compressed seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style. Dr. Linnæus and Tournefort both join this to the Gooseberry, making them the same genus, which in a system of botany is very right; but, as they are always separated by gardeners, I have chosen to continue them so here.

The SPECIES are,

1. RIBES (*Rubrum*) inerme, racemis glabris pendulis, floribus planiusculis. Lin. Sp. Plant. 200. *Currant without thorns, having smooth hanging bunches, and plain flowers.* Ribes vulgare acidum. J. B. 2. p. 97. *Common four Currant.*
2. RIBES (*Alpinum*) inerme, racemis erectis, bracteis flore longioribus. Lin. Sp. Plant. 200. *Smooth Currant with erect bunches, and bractæ longer than the flower.* Ribes Alpinum dulce. J. B. 2. p. 98. *Sweet Alpine Currant.*
3. RIBES (*Nigrum*) inerme, racemis pilosis, floribus oblongis. Lin. Sp. Plant. 201. *Currant without spines, having hairy branches and oblong flowers.* Ribes vulgaris fructu nigro. Rudb. Flor. Lapp. 99. *Common black Currant.*
4. RIBES (*Americanum*) inerme, racemis glabris, floribus campanulatis. *Currant with unarmed branches, and bell-shaped flowers.* Ribes Americana fructu nigro. Ed. prior. *American Black Currant.*

The first sort grows naturally in the northern parts of Europe, but has been long cultivated in the gardens, and greatly improved, so that at present there are the following varieties in the English garden; the common Currant with small red fruit, the same with white fruit, and another with pale fruit, which is commonly called the Champaign Currant; but, since the two sorts of Dutch Currants have been introduced, and become plenty in the gardens, the old red and white Currants have been almost banished, so that they are rarely to be found in the English gardens at present.

The second sort is kept in a few gardens for the sake of variety, but, as the fruit is very small and has little flavour, it is not cultivated in the gardens.

The third sort grows naturally in Helvetia, Sweden, and other northern countries, and is sometimes cultivated in gardens for its fruit, of which is made a rob, which is greatly esteemed for sore throats, from whence the fruit has been called Squinancy Berries, for their great use in quinsies. As this fruit has a strong disagreeable flavour, it is rarely admitted to the table.

The fourth sort grows naturally in Pennsylvania, from whence the plants were sent to Mr. Peter Collinson several years past, and has been dispersed to most parts of England; this has been by some thought to be the same with the common black Currant, but those who have long cultivated it, know it is very different; the shoots of this being much smaller and more compact, the bark is of a darker colour, the leaves are smaller, thinner, smoother, and have not a rank smell like those of the common sort. The flowers are smaller, bell-shaped, and grow in thinner bunches; the fruit is smaller, and not so round; the plants of this

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this do not produce much fruit, nor is it so good as to merit cultivation, so it is only kept by way of curiosity. The fruit of the red and white Currants are greatly esteemed for the table, and are also very good in fevers; they are cooling and grateful to the stomach, quench thirst, and are somewhat restraining. The jelly made with the juice of this fruit and sugar, is very grateful in fevers, and is used as sauce to the table. This fruit may be procured good much longer than others upon the plants, by planting them in different situations; for if they are planted against pales or walls exposed to the south, the fruit will ripen in June; and by planting some against north walls, if they are screened from birds, and covered in autumn from frost, they may be kept till November; and as the fruit is greatly used for tarts, it is very convenient to have a succession of it for so long a time.

The Champaign Currant differs from the other only in the colour of the fruit, which is of a pale red or flesh colour. The taste is so near to the other, as not to be distinguished; but this being of a different colour, makes a variety on the table.

There are plants of all these sorts with variegated leaves, which are kept in some gardens for the sake of variety; but as these variegations go off when the plants are vigorous, they scarce deserve notice.

These sorts may be easily propagated by planting their cuttings any time from the beginning of September to the middle of October, upon a spot of fresh earth, either in rows at one foot asunder, or in beds, which in the spring must be kept very clean from weeds, and in very dry weather, if they are watered, it will greatly promote their growth. These may remain one or two years in the nursery, during which time they must be pruned for the purposes designed, i. e. either to clear stems about one foot high, if for standards; or if for walls, pales, or espaliers, they may be trained up flat.

Then they should be planted out where they are to remain; for the younger they are planted, the better they will succeed; the best season for which is soon after the leaves begin to decay, that they may take root before winter, so that they may be in no danger of suffering from drought in the spring.

These plants are generally planted in rows at about eight or ten feet asunder, and four distance in the rows, in those gardens where the fruit is cultivated for sale; but the best method is to train them against low espaliers, in which manner they will take up much less room in a garden, and their fruit will be much fairer.

The distance they should be placed for an espalier ought not to be less than eight or ten feet, that their branches may be trained horizontally, which is of great importance to their bearing.

Those that are planted against pales or walls should also be allowed the same distance. If they are planted against a south-east wall or pale, it will cause their fruit to ripen at least a fortnight or three weeks sooner than those in the open air; and those which are planted against a north wall or pale will be proportionably later, so that by this method the fruit may be continued a long time in perfection, especially if those against the north pales are matted in the heat of the day.

These plants produce their fruit upon the former year's wood; and also upon small snags which come out of the old wood, so that in pruning them, these snags should be preserved, and the young shoots shortened in proportion to their strength. The only method very necessary to be observed in pruning of them is, not to lay their shoots too close, and never to prune their snags to make them smooth. This, with a small care in observing the manner of their growth, will be sufficient to instruct any person how to manage this plant, so as to produce great quantities of fruit.

These plants will thrive and produce fruit in almost any soil or situation, and are often planted under the shade of trees; but the fruit is always best when they are planted in the open air, and upon a light loamy soil.

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RICINOIDES. See IATROPHA.

RICINUS. Tourn. Inst. R. H. 532. tab. 307. Lin. Gen. Plant. 962. [so called, because the seed resembles (ricinus) the animal called by that name, i. e. a tick which infests dogs and oxen. It is also called Palma Christi, because its leaves are said to resemble the palm of the hand.] Palma Christi, vulgò.

The CHARACTERS are,

It hath male and female flowers disposed in the same spike. The male flowers, which are situated on the lower part of the spike, have swelling empalements of one leaf cut into three parts. These segments are oval and concave; the flowers have no petals, but have a great number of slender stamina, which are connected in several bodies, and are terminated by roundish twin summits. The female flowers, which are situated on the upper part of the spike, have empalements of one leaf, which are cut into five segments, and are armed with prickles; they have no petals, but in the center is situated an oval germen, which is closely shut up in the empalement, supporting three short styles, which are bifid, crowned by single stigmas. The germen afterward turns to a roundish fruit, having three furrows, divided into three cells, opening with three valves, each cell containing one almost oval seed.

This genus of plants is ranged in the ninth section of Linnæus's twenty-first class, which contains those plants which have male and female flowers on the same plant, whose stamina are joined in various bodies.

The SPECIES are,

1. RICINUS (*Vulgaris*) foliis peltatis ferratis, subtus glaucis, petiolis glanduliferis. *Ricinus with target-shaped sawed leaves which are gray on their under side, and foot-stalks bearing glands.* Ricinus vulgaris. C. B. P. 432. *Common Palma Christi.*
2. RICINUS (*Americanus*) foliis peltatis subserratis, lobis amplioribus utrinque virentibus. *Ricinus with target-shaped leaves, which are sawed, whose lobes are large and green on both sides.* Ricinus Americanus major. C. B. P. 432. *Great American Palma Christi.*
3. RICINUS (*Urens*) foliis peltatis inæqualiter ferratis, capsulis hispidis. Tab. 219. *Ricinus with target-shaped leaves which are unequally sawed, and prickly capsules to the fruit.* Ricinus Americanus major, caule virecente. H. R. Par. *Greater American Palma Christi with a greenish stalk.*
4. RICINUS (*Rugosus*) foliis peltatis ferratis, capsulis rugosis non echinatis. Tab. 220. *Palma Christi with target-shaped sawed leaves, and rough capsules to the fruit which are not prickly.*
5. RICINUS (*Africanus*) foliis peltatis ferratis, lobis maximis, caule geniculato, capsulis echinatis. *Ricinus with target-shaped sawed leaves, having the largest lobes, a jointed stalk, and prickly covers to the seeds.* Ricinus Africanus maximus, caule geniculato rutilante. H. R. Par. *Greatest African Palma Christi, with a reddish jointed stalk.*
6. RICINUS (*Inermis*) foliis peltatis ferratis, lobis maximis, caule geniculata, capsulis inermis. *Palma Christi with sawed target-shaped leaves, having very large lobes, a jointed stalk, and smooth covers to the seeds.*
7. RICINUS (*Minor*) foliis palmatis ferratis, profundius divisis capsulis echinatis. *Ricinus with hand-shaped sawed leaves which are deeply divided, and prickly covers to the seeds.* Ricinus Americanus minor. C. B. P. 432. *Small American Palma Christi.*

The first sort grows naturally in Sicily, and other warm parts of Europe. This rises with a strong herbaceous stalk to the height of ten or twelve feet; the joints are at a great distance from each other; the stalk and branches are of a gray colour; the leaves are large, and have long foot-stalks; they are deeply divided into seven lobes which are sawed on their edges, and are gray on their under side; at the division of the lobes is a sort of navel, where the foot-stalk joins the leaves on their under side. The flowers are disposed in long spikes, which rise at the division of the branches; the lower part of the spikes are garnished with male flowers, which have swollen empalements, divided into three parts which open, and shew a great

a great number of slender stamina, terminated by whitish summits, and are connected at their base into several small bunches. The female flowers which occupy the upper part of the spike, have prickly empalements which inclose the roundish germen, upon which sit three short styles, crowned by oblong stigmas. The germen afterward becomes an oval capsule with three deep channels, closely armed with soft spines, and divided into three cells, each containing one oblong striped seed.

The second sort grows naturally in the islands of the West-Indies, where it is called *Agnus Castus*, or Oil-tree. This is often confounded with the former, most of the botanists supposing they are the same plant; but as I have cultivated both more than thirty years, in which time I have never observed either of them to vary, so I think there can be no doubt of their being different plants. This hath brown stalks which divide into two or three branches, which rise six or seven feet high; the leaves are broader, and not so deeply divided as those of the former; they are of a deep green on both sides, and are unequally sawed. The spikes of flowers are shorter, the seed-vessels rounder, and of a brownish colour, and the seeds are much less, and of a brown colour.

The third sort grows naturally in the West-Indies, and is often confounded with the former, but is very different. The stalk of this sort is thick, herbaceous, and of a grayish green; the joints are closer than those of the former sorts; it rises about four feet high, and divides into three or four branches which spread almost horizontally; the leaves are large, of a deep green on their upper side, but grayish on their under; they are deeply cut into six or seven lobes or segments, which are unequally sawed on their edges. The spikes of flowers are loose, the covers of the capsules are green, and closely armed with soft spines, and the seeds are smaller and lighter coloured than those of the second sort.

The fourth sort grows naturally in both Indies, from both which countries I have several times received the seeds. This rises with an herbaceous stalk about four feet high; the lower part is purplish, and the upper of a deep green; the joints of this are pretty far asunder; the leaves are of a deep green on their upper side, but are paler on their under; they are not so deeply divided as some of the other sorts, and are more regularly sawed, the spikes of flowers are large. The male flowers have more stamina, and their summits are yellow; the capsules are oval and rough, but have no spines; the seeds are small, and of a brown colour.

The fifth sort grows naturally in Africa, and also in both the Indies; this rises with a large reddish stalk to the height of ten or twelve feet, which has many joints, and divides into several branches; the leaves are the largest of any species yet known, I have measured some of them which were more than two feet and a half diameter; they are of a dark green, and unequally sawed on their edges, and not so deeply cut as those of some other sorts. The spikes of flowers are large, the empalement of the flowers are brown, the summits on the stamina of the male flowers are whitish; the capsules are large, oval, and closely armed with soft spines; the seeds are very large, and beautifully striped.

The sixth sort grows naturally in the Spanish West-Indies, from whence the late Mr. Robert Millar sent me the seeds. The plants of this sort are in every respect like those of the fifth, but the capsules which inclose the seeds are smooth; and this difference is permanent, therefore it may be put down as a distinct species.

The seventh sort grows naturally in Carolina, and several other parts of America; of this there are two varieties, if not distinct species; one of them has a red stalk, and the other a pale green stalk; they are distinguished by the inhabitants of America, by the title of red and white Oil-seed. The stalks of these seldom rise more than three feet high, they some-

times divide at the top into two or three branches; the leaves are much less than those of the other sorts, and are deeper divided; their borders are unequally sawed, and the segments of the leaves are frequently cut on their sides. The spikes of flowers are smaller and more compact than those of the former sorts; the capsules are smaller, rounder, and of a light green, and are closely armed with soft spines; the seeds are small, and are finely striped.

There are some other species which grow naturally in both Indies, but have not been examined by any curious botanist; for I have received seeds of three or four sorts, which appeared to be very different from any of the known sorts, but the seeds of some were too old to grow, and the other were killed before their seeds were ripe.

The sorts here enumerated, I have cultivated several years, and have always found they have kept their difference, so that I have no doubt of their being distinct species; and unless they are thus tried, there is no possibility of determining their specific difference; for when the plants are found growing in different soils and situations, they have such different appearances, as may deceive the most skilful botanist.

These plants are generally annuals in these countries, though in their native places of growth they continue longer; and in England the plants are often preserved through the winter (especially the first sort) but young plants are much preferable to those which are thus preserved; therefore few persons are at the trouble to keep them, unless when the seasons prove so bad as that their seeds do not ripen, whereby the species might be lost, if the plants are not preserved through the winter.

These plants are propagated by seeds, which must be sown upon a hot-bed in the spring, and when the plants are come up, they should be each planted into a separate pot filled with light fresh earth, and plunged into a fresh hot-bed, observing to water and shade them until they have taken root; after which they must have a great share of free air when the season is mild, otherwise they will draw up tall, and be very weak; and as these plants grow very fast, their roots will in a short time fill the pots; therefore they should be shifted into larger pots, filled with the like fresh earth; and toward the latter end of May, when the season is warm, they may be hardened to endure the open air by degrees; and then if some of the plants are shaken out of the pots, and planted out into a very rich border, and in dry weather duly watered, they will grow to a very large size, particularly the first and fifth sorts, which I have seen upward of ten feet high in one season, and these plants have produced a great quantity of flowers and seeds: but if you intend to preserve any of the plants through the winter, they must not be planted in the full ground, because after their roots have been widely extended, there will be no transplanting them with safety; therefore the best way is to shift them into larger pots from time to time, as their roots shall require, placing them in the open air during the summer season in some warm situation, where they may remain until October, when they must be removed into the house with other exotic plants, observing to water them sparingly in winter, and also to admit the free air in mild weather; for they only require to be protected from frost and cold winds, so that they will endure the winter in a warm green-house, without any addition of artificial warmth.

These plants deserve a place in every curious garden for the singular beauty of their leaves (notwithstanding their flowers make no great appearance) especially those sorts which may be propagated every year from seeds; because those persons who have no green-house to place them into in winter, may cultivate them as other annual plants, amongst which these being placed, either in pots or borders, afford an agreeable variety; but it must be observed, as these are large-growing plants, never to place them too near other plants of less growth, because they will overbear and destroy them;

them ; and those which are planted in pots should be allowed room for their roots to expand, and must be frequently watered, otherwise they will not grow very large.

The inhabitants of the West-Indies draw an oil from the seeds of these plants, which serves for the use of their lamps ; and as the plants come up as weeds in those warm countries, so they are at no trouble to cultivate the plants, but employ their negroes to collect the seeds from the plants which grow naturally, whereby they are furnished with the oil at a small expence. This oil is good to kill lice in children's heads ; and of late years it has been a most effectual remedy for the dry belly-ach, which was a fatal distemper in the West-Indies ; it has also been found serviceable in England, in such disorders where no other medicine will pass through the body. This oil is falsely called Castor Oil in the West-Indies, from the corrupt title of *Agnus Castus* there given to the plant.

The seeds of the first sort is the *Cataputia* major of the shops ; these have been formerly given by some persons to purge watery humours, which they do both upward and downward with great violence, so that at present these seeds are rarely used.

RIPENING of FRUIT.

The METHOD of producing EARLY FRUITS.

In order to have early fruit, a wall should be erected ten feet high, and in length according to the number of trees intended for three years forcing ; the method of constructing these walls is fully explained under the article *WALL*.

This being done, a border may be marked out about four feet wide on the south side of it, and some scantlings of wood, about four inches thick, must be fastened to the ground in a strait line, on the outside of the border, to rest the glass lights upon ; which lights are to slope backward to the wall, to shelter the fruit as there shall be occasion.

Bars about four inches wide, cut out of the whole deal, must be placed between these glasses, so that the lights may rest on them. There must also be a door shaped to the profile of the frame at each end, that it may be opened at either of the ends, according as the wind blows.

The frame before-mentioned should be made so, that when the first part has been forced, the whole frame may be moved the next year forward, and the succeeding year forward again, so that the trees will be forced every third year ; and having two years to recover themselves, will continue in vigour many years. These trees should be well grown before they are forced, otherwise they will soon be destroyed ; and the fruit produced on grown trees will be much fairer and better tasted, than on fresh planted trees.

The fruit that may be planted in these frames are ; The *Avant*, the *Albemarle*, the *Early Newington*, and *Brown Nutmeg Peaches*.

Mr. Fairchild's Early, the *Elruge* and *Newington Nectarines* ; the *Masculine Apricot* ; the *May Duke* and *May Cherry*.

As for *Grapes*, the *Chasselas* and *Black Cluster*. *Gooseberries* ; the *Dutch White*, the *Dutch Early Green*, and the *Walnut Gooseberries*.

Currants ; the large *Dutch White*, the large *Dutch Red Currants*.

It has been found by experience, that the trees will be injured, if the heat be applied before the middle or end of January ; and that the time for applying the heat for bringing either *Duke* or *May Cherries*, is about the middle of that month, and applying heat at the same time would do for *Apricots* ; so that the *Masculine Apricot* will, by the beginning of March, be as large as *Duke Cherries*, and will be ripe by the beginning of May.

Cherries thus forced will not hold so well as *Apricots*, though the former will last, perhaps, for seven years in good plight, but *Apricots* will thrive and prosper thus many years.

Fairchild's Early Nectarine commonly ripens about

the end of May, if they are forced at the same time ; and the *Brugnion Nectarine* will follow that. As to the forward sorts of *Plums*, they ripen about the latter end of May.

Gooseberries will produce green fruit fit for tarts in March, and probably will ripen about the beginning or middle of April at the farthest.

Currants might, by the same heat that brings *Cherries* in April, be forced to produce ripe fruit at the same time, if not sooner.

As for the distance of these trees one from another, it need not be so great as is directed for those planted in the open air, because they will never shoot so vigorously nor last so long, therefore eight or nine feet will be sufficient.

The higher parts of the wall being furnished with *Apricots*, *Cherries*, *Nectarines*, *Peaches*, and *Plums*, the lower small space between them may be filled up with *Currants*, *Gooseberries*, and *Roses*.

The trees against that part of the wall which is designed for forcing, should be pruned as soon as their leaves begin to decay, that the buds on the branches which are left may be benefited, by receiving all the nourishment of the branches, whereby they will become turgid and strong, by the time the walls are heated.

As to the nailing of these trees.

Every branch or shoot must be laid as close to the wall as can be ; for the fruit which is near the wall will be ripe a month sooner than those that lie but four inches from it.

Sometimes it happens, that the tops of such trees have blossoms above a month or six weeks before the bottom ; and sometimes one branch has been full of blossoms, when there have been half a score or more branches of the same tree, which have not stirred till the fruit of the first blossoms has been almost grown, notwithstanding which the tree has done very well ; and it is no uncommon thing for such trees to have fruit ripening upon them for near three months continually.

As for *Gooseberries*, those plants which are planted in these frames, should be such as have been spread and trained, when as many shoots have been nailed to the wall as may conveniently be done, others may be left at a distance from it, to succeed them in ripening.

If they are taken up in autumn, and properly managed, they will bear fruit the first year as well as if they had not been transplanted, but these seldom last longer than two or three years.

The *Currants* may be ordered after the same manner, and also the *Roses* ; and the best kind of *Rose* for this purpose, is the *monthly Rose*, which ought always to be topped about the end of July or the beginning of August, to make them put out a good number of flower-buds.

As to the laying dung to the wall :

This, before it be laid to the back of the wall, should be thrown up in a heap, and lie eight days, then turned over, that it may be of an equal heat every where, and constant.

When it has been thus prepared, it should be laid about four feet thick at the base, and so sloping, till it is but two feet wide at the top.

It should be laid at first within four inches of the top of the wall, for it will sink two feet in six weeks time ; and then some fresh dung must be laid, because the first heat will not do much more than swell the buds of the trees, or bring them to flower.

But, according as the frosts shall have happened to have had more or less influence over the buds, this will happen sooner or later.

If these trees be covered with the glasses a month before the dung is laid against the wall, it will contribute very much to forward their blossoming ; for though their blossoms will not be destroyed by the frosts, yet the more the frosts come at them, they will be the drier and more hard to open.

If the weather is tolerably mild, the trees ought not to be hindered from the benefit of the showers till

the buds begin to stir; but afterwards the glasses should be kept constantly over them, till the influence of the sun is something considerable.

But the doors which are at each end of the frame, should in the mean time be set open, when the wind does not blow too sharp, and the sun shines warm; and if this does not happen in the space of a fortnight, then the doors at both ends may be opened, and mats of bafs or canvas should be hung up over the door-ways to correct the winds, and give the air leave to circulate in the frames.

As for Cherries; about two changes of dung will be sufficient to bring them to a due ripeness in April, supposing each parcel remains six weeks at the back of the wall.

But as for Apricots, Grapes, Nectarines, Peaches, and Plums, if April proves cold, the forcing heat must be continued till May is settled; but some of the glasses should be opened in the morning in March and April, when the wind is still, and the sun warm; and they should be permitted to receive the showers that fall, while the fruit is growing; but while they are in blossom, no rain should come near them, because, if there should be any moisture lodged in the bosom of the flowers, and the sun should shine hot through the glasses, it would be apt to destroy them. The dung that comes from these frames, having lost its heat, may be laid in heaps to rot, for the meliorating of stubborn grounds; or if it is thrown in heaps and mixed with new dung, it will ferment again, and may be used for hot-beds.

Another thing which ought to be observed in planting fruit in these frames is, to plant those fruits which come forward together, and those which come late by themselves, because it will be prejudicial to the forward fruit, to give them any more heat when they have done bearing, when at the same time the later fruits set amongst them may require more heat, and to be continued longer, some of them perhaps requiring an artificial heat till May.

There may also a row or two of Scarlet Strawberries be planted near to the back of this frame, and these you may expect will be ripe by the end of March, or beginning of April.

As for the Vines, they may probably be brought to blossom in April, and have ripe Grapes in June.

There may also be here and there planted a monthly Rose-tree, and Hyacinths, Jonquils, Narcissuses, Polyanthes; also early Tulips might be placed in the borders.

The method of forcing fruit-trees by the help of fire-walls, is fully treated under the article WALLS.

RIVINIA. Plum. Nov. Gen. 48. tab. 39.

The CHARACTERS are,

The empalement of the flower is permanent, and is composed of four oval, concave, coloured leaves. The flower has no petals; it has eight stamina which are longer than the empalement, terminated by small oval summits, and a large roundish germen supporting a short style, crowned by an obtuse stigma. The germen afterward turns to a roundish berry sitting in the empalement, including one hard seed.

The title of this genus was given to it by Father Plumier, who discovered these plants in America, in honour of Augustus Quirinus Rivinus, a famous botanist of Leipick, who published two volumes of plants in folio, in which the figures of the plants are engraven on copper plates. These were published in 1690.

Dr. Linnæus has applied the title of this genus to the Solanoides of Tournefort, which is totally different from Plumier's plants; and the Doctor has charged Father Plumier with an error in the engraving of the characters of this genus, with eight stamina instead of four, whereas Plumier's plants have eight stamina; but the plant which the Doctor has applied to this title has but four, therefore the mistake is the Doctor's and not Father Plumier's.

The SPECIES are,

1. RIVINIA (*Humilis*) foliis lanceolatis petiolatis inte-

gerrimis, caule fruticoso ramoso. *Rivinia with spear-shaped entire leaves having foot-stalks, and a shrubby branching stalk.* Rivinia humilis racemosa, baccis puniceis. Plum. Nov. Gen. 48. *Dwarf branching Rivinia with scarlet-coloured berries, sometimes called Currant-tree.*

2. RIVINIA (*Scandens*) scandens racemosa, amplis foliis foliis baccis violaceis. Plum. Nov. Gen. 48. *Climbing branching Rivinia, with Nightshade leaves and Violet-coloured berries, commonly called Hoopwith in the West-Indies.*

The first sort rises with shrubby stalks about six or eight feet high, dividing into several spreading branches, covered with a gray spotted bark, garnished with spear-shaped entire leaves, standing upon long slender foot-stalks; these are two inches and a half long, and one broad in the middle, drawing to a point at each end; they are smooth, of a lucid green, and pretty thick consistence, standing alternate, at pretty great distances on the branches. The flowers are produced in long bunches from the side and at the end of the branches, each standing upon a slender foot-stalk near half an inch long; they have no petals, but their empalements are of a scarlet colour; within these are situated eight stamina which are longer than the empalement, terminated by small oval summits; in the center is situated a roundish germen, terminating in a point, supporting a short style. The germen turns to a roundish berry with a thin pulp, surrounding one roundish hard seed; these berries are of a scarlet colour when ripe, and afterward change to a purple; they are by the inhabitants called Currants, but are generally esteemed poisonous.

The second sort rises with a climbing woody stalk to the height of twenty feet, covered with a dark gray bark, and is garnished with oval spear-shaped leaves near three inches long, and an inch and a half broad, standing upon short foot-stalks; they are smooth and entire. The flowers come out in long bunches from the side of the branches, and are shaped like those of the other, and are succeeded by blue berries about the same size as those of the former. This sort grows naturally in Antigua, from whence I have received the seeds; it was also found growing at the Havannah, by the late Dr. Houstoun, who found the first growing in Jamaica.

They are both propagated by seeds, which remain long in the ground before they vegetate; I have had them lie two years before the plants have appeared, but they never rise the same year the seeds are sown.

These berries must be procured from the countries where they naturally grow, and when they arrive, should be sown in pots filled with fresh earth, and plunged into a moderate hot-bed. If this happens late in the autumn or winter, the pots must be plunged into the tan-bed of the stove; but if in the spring, they may be plunged in a common hot-bed under a frame. The earth must be moistened frequently in summer, to promote the vegetation of the seeds, but as they will not come up the same year, so the pots should be removed into the stove before winter, and plunged into the tan-bed; during the winter season, the earth must be sometimes refreshed, but must not be too moist. In the spring the pots may be taken out of the stove, and plunged into a fresh hot-bed to bring up the plants; but if they should not then rise, the earth must not be disturbed, because the plants may come up the following season.

When the plants come up and are fit to remove, they should be each transplanted into a separate small pot, filled with light loamy earth, and plunged into a hot-bed, observing to shade them from the sun till they have taken new root; after which they must be treated in the same way as other plants from the same countries.

These plants are tender, so cannot be preserved in this country, unless they are kept in a warm stove, especially while they are young; but when they have obtained strength, they will live in a moderate warmth in winter, and in summer they may be removed into the

the open air, placing them in a sheltered situation, where they may remain for near three months in the warmest part of summer: during the winter season, these plants should be sparingly watered, for as they grow naturally on a dry soil, much wet will destroy them, especially in cold weather.

They retain their leaves all the year, so make a variety in the stove in winter, and when they flower, make a fine appearance, though their flowers are but small; for as they are produced in long bunches, from almost every joint toward the end of the branches, so the whole plant is well adorned during their continuance; and if they do produce fruit, as that will remain long before it is ripe, so their beauty will be of longer duration.

ROBINIA. Lin. Gen. Plant. 775. Pseudoacacia. Tourn. Inst. R. H. 649. tab. 417. False Acacia.

The CHARACTERS are,

The empalement of the flower is small, of one leaf, and divided into four parts, the three under segments being narrow, but the upper one is broad. The flower is of the Pea bloom kind: the standard is large, roundish, obtuse, and spreads open. The two wings are oval, and have short appendixes which are obtuse. The keel is roundish, compressed, obtuse, and is extended the length of the wings. In the center is situated ten stamina, nine of them being joined together, and the other standing single, terminated by roundish summits. It hath an oblong cylindrical germen, supporting a slender style, crowned by a hairy stigma; these are inclosed by the keel. The germen afterward becomes an oblong compressed pod, inclosing kidney-shaped seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which includes those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. ROBINIA (*Pseudoacacia*) racemis pedicellis unifloris, foliis impari-pinnatis, stipulis spinosis. Hort. Upsal. 212. *Robinia* with branching foot-stalks each supporting one flower, unequal winged leaves, and prickly stipule. Pseudoacacia vulgaris. Tourn. Inst. R. H. 649. Common Bastard Acacia, or American Acacia, called in America Locust-tree.
2. ROBINIA (*Echinata*) pedunculis racemosis, foliis impari-pinnatis, leguminibus echinatis. *Robinia* with foot-stalks supporting long bunches of flowers, unequal winged leaves, and prickly pods. Pseudoacacia Americana, filiquis echinatis. Boerh. Ind. alt. 11. 39. American Acacia with prickly pods.
3. ROBINIA (*Hispida*) foliis impari-pinnatis, foliolis ovatis, ramis pedunculisque hispidis. *Robinia* with unequal winged leaves having oval lobes, and the branches and foot-stalks of the flowers armed with stinging spines. Pseudoacacia hispida, floribus roseis. Catesb. Car. 3. p. 20. Stinging false Acacia, with a Rose-coloured flower.
4. ROBINIA (*Rosea*) foliis impari-pinnatis, foliolis ovatis acuminatis, ramis nodosis glabris, pedunculis racemosis. *Robinia* with unequal winged leaves, whose lobes are oval, acute-pointed, knobbed smooth branches, and flowers growing in long bunches. Pseudoacacia flore roseo. Plum. Cat. Bastard Acacia with a Rose-coloured flower.
5. ROBINIA (*Glabra*) foliis impari-pinnatis, foliolis oblongo-ovatis, pedunculis racemosis confertis. *Robinia* with unequal winged leaves having oblong oval lobes, and foot-stalks with long bunches of flowers growing in clusters. Pseudoacacia arborea floribus racemosis, filiquis compressis glabris. Houft. MSS. Tree-like Bastard Acacia, with flowers growing in long bunches, and flat smooth pods.
6. ROBINIA (*Alata*) foliis impari-pinnatis, foliolis obversè-ovatis, racemis aggregatis axillaribus, leguminibus membranaceo-tetragonis. *Robinia* with unequal winged leaves, whose lobes are obversely oval, long bunches of flowers growing in clusters from the sides of the branches, and pods having four-winged membranes. Pseudoacacia filiquis alatis. Plum. Cat. 19. False Acacia with winged pods. Linnæus titles it *Erythrina* foliis pinnatis, leguminibus membranaceo-tetragonis. Sp. Plant. 707.

Coral-tree with winged leaves and pods, having four membranaceous wings.

7. ROBINIA (*Pyramidata*) foliis duplicato-pinnatis, foliolis ovatis sessilibus, floribus spicatis terminalibus. *Robinia* with doubly-winged leaves, whose lobes are oval and sit close to the midrib, and spikes of flowers terminating the branches. Pseudoacacia flore pyramidato coccineo. Plum. Cat. 19. False Acacia with a scarlet-coloured flower growing pyramidally.
8. ROBINIA (*Violacea*) foliis pinnatis, foliolis lanceolatis oppositis, racemis axillaribus pedunculis longioribus. *Robinia* with winged leaves having spear-shaped lobes placed opposite, and long bunches of flowers on the sides of the branches, with longer foot-stalks. Pseudoacacia fraxini folio, floribus violaceis. Plum. Cat. 19. False Acacia with an Ash leaf, and Violet-coloured flowers.
9. ROBINIA (*Latifolia*) foliis impari-pinnatis, foliolis oblongis acuminatis, racemis axillaribus, leguminibus oblongo-ovatis. *Robinia* with unequal winged leaves, having oblong acute-pointed lobes, and bunches of flowers proceeding from the sides of the branches. Pseudoacacia latifolia, filiquis latis. Houft. MSS. False Acacia with broad leaves and pods.
10. ROBINIA (*Frutescens*) pedunculis simplicibus, foliis quaternatis subpetiolatis. Hort. Upsal. 212. *Robinia* with single foot-stalks, and leaves growing by fours upon short foot-stalks. *Aspalathus frutescens* major latifolius cortice aureo. Am. Ruth. 283. Greater, broad-leaved, shrubby *Aspalathus*, with a golden bark.
11. ROBINIA (*Caragana*) pedunculis simplicibus, foliis abrupte pinnatis. Hort. Upsal. 212. *Robinia* with simple foot-stalks, and abrupt winged leaves. *Aspalathus arborecens*, pinnis foliorum crebrioribus oblongis. Amman. Ruth. 285. Tree-like *Aspalathus* with oblong lobes.
12. ROBINIA (*Pygmæa*) pedunculis simplicissimis, foliis quaternatis sessilibus. Hort. Upsal. 212. *Robinia* with the most simple foot-stalks, with four leaves sitting close to the stalks. *Aspalathus frutescens* minor angustifolius, cortice aureo. Amman. Ruth. 282. tab. 35. Smaller shrubby *Aspalathus*, with narrow leaves and a yellow bark.

The first sort is the common Pseudoacacia, which is a native of North America; the seeds of this were first brought to Paris from Canada by Mons. Robine, and soon after the seeds were brought from Virginia to England, and many of the trees were raised in several gardens, which for some years, while young, were in great esteem; but as they grew larger, their branches were frequently broken by strong winds in the summer, which rendered them unsightly, so that for several years they were seldom planted in gardens; but of late years it is become fashionable again, and great numbers of the trees have been raised in most parts of England, within a few years past, so that there are few gardens in which there are not some of these trees planted.

This sort grows to a very large size in America, where the wood is much valued for its duration; most of the houses which were built at Boston in New England, upon the first settling of the English, was with this timber, which continues very sound at this time.

It grows very fast while young, so that in a few years from seed, the plants rise to eight or ten feet high; and it is not uncommon to see shoots of this tree six or eight feet long in one summer. The branches are armed with strong crooked thorns, and garnished with winged leaves composed of eight or ten pair of oval lobes, terminated by an odd one; they are of a bright green, entire, and sit close to the midrib. The flowers come out from the side of the branches in pretty long bunches, hanging downward like those of Laburnum, each flower standing on a slender foot-stalk. They are of the butterfly or Pea blossom kind, are white, and smell very sweet. They appear in June, and when the trees are well charged with flowers, they make a fine appearance, and their odour perfumes the circumambient air; but they are of short duration, seldom continuing more than one week

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in beauty; after the flowers fade, the germen becomes an oblong compressed pod, which in warm seasons comes to perfection in England; these ripen pretty late in the autumn.

The leaves of this tree do not come out till late in the spring, and they fall off pretty early in the autumn, which renders it less valuable than it would otherwise be, were these leaves to come out early in the spring.

The second sort is less common than the first. There was a large tree of this kind some years past, growing in the garden of the Bishop of London at Fulham, which produced plenty of seeds. The pods of this sort are much shorter, and closely beset with short prickles, but in other respects agrees with the first sort.

The third sort grows naturally in Carolina, where it sometimes rises to the height of twenty feet, but in England at present it seems to be of low growth; the branches spread out near the ground, and produce their flowers very young, which is a sure sign of its not growing tall here. The branches of this tree, and also the foot-stalks of the flowers, are closely armed with small brown spines, like some sorts of Roses; the leaves are like those of the first sort, but their lobes are larger and rounder. The flowers come out in bunches like those of the former, but are larger and of a deep Rose colour. It flowers about the same time with the first, but has not as yet produced any pods in England.

The fourth sort grows naturally at Campeachy, from whence the late Dr. Houstoun sent the seeds. This rises with a strong woody stem to the height of thirty or forty feet, sending out many strong branches on every side, which have large swelling knots, and are closely garnished with single winged leaves, composed of eight or nine pair of oval lobes ending in points, terminated by an odd one; these are curiously marked with purple spots on their under side, which appear faintly on their upper. The flowers are produced in long close spikes, standing almost erect; they are about half the size of the flowers of the last sort, and are of a fine Rose colour.

The fifth sort was found growing naturally at Campeachy by the late Dr. Houstoun; this rises with a woody branching stalk twelve or fourteen feet high; the old branches are covered with a dark brown bark, but the young shoots and the foot-stalks of the flowers are covered with an iron-coloured down; the leaves are unequally winged; the lobes are oblong, obtuse, and of a pretty thick consistence; they are smooth on their upper side, but have several transverse veins on their under. The flowers are produced at the end of the branches in long close bunches; there are six or seven of them gathered together in clusters. The flowers are but small, and are of a yellowish red colour; the pods of this are like those of the first sort.

The sixth sort grows naturally in Jamaica, where the inhabitants give it the appellation of Dogwood. This hath a strong woody stem which rises forty feet high, and divides into many branches, which are covered with a dark brown spotted bark, and garnished with unequal winged leaves, composed of three or four pair of obverse oval lobes, terminated by an odd one; they are two inches and a half over, smooth on their upper side, but are veined on their under, which are of a buff colour. The flowers come out in branching bunches from the side of the branches; these generally appear at a time when the trees are destitute of leaves, and as they have large clusters of flowers at every joint, so the trees seem covered with them. The bunches at the extremity of the branches are the largest, and are formed pyramidally. The flowers are but small, and do not open so fully as those of the first sort, but are of a pale Rose colour, so make a fine appearance; these are succeeded by pods, having four broad membranaceous wings running longitudinally at the four corners of the pods, and these join at their base, covering the pods entirely; each

of the pods contain four or five oblong kidney-shaped seeds.

The seventh sort was discovered by Plumier, in some of the French settlements of the West-Indies, and it was afterward found by the late Dr. Houstoun growing naturally at Campeachy. This rises with a strong woody stem near thirty feet high, sending out many spreading branches, which are covered with a light gray bark spotted with white, and garnished with double winged leaves, whose lobes are oval and sit close to the midrib; they are of a lucid green on their upper side, but of a pale green on their under. The flowers are produced in long loose pyramidal bunches toward the end of the branches, those on the lower part of the bunch having long foot-stalks, which diminish gradually to the top, so as to form a pyramid; these bunches are almost erect. The flowers are of a scarlet colour, so make a fine appearance. The eighth sort was found growing naturally at Campeachy by the late Dr. Houstoun; this rises with a woody stem to the height of twenty feet, dividing at the top into several spreading branches, which are covered with a very light gray bark, and garnished with equal winged leaves, composed of ten or eleven pair of oval lobes placed opposite; they are of a lucid green on the lower part of the branches, but those toward the end are covered with a soft iron-coloured down. The flowers come out in long bunches from the side of the branches, they are blue, and stand upon long foot-stalks; these are succeeded by pods shaped like those of the first sort, but are downy.

The ninth sort was discovered by the late Dr. Houstoun, growing naturally at Campeachy. This sort rises with a strong woody stem upward of thirty feet high, dividing at the top into many strong branches, covered with a dark grayish bark, spotted with white, and are garnished with winged leaves, composed of six or seven pair of lobes, terminated by an odd one; they are two inches and a half long, and an inch and a half broad, ending in a point, of a lucid green on their upper side, but pale on their under. The flowers are produced in long loose bunches from the side of the branches; they are of a pale Rose colour, and have very long foot-stalks; these are succeeded by oval pods two inches and a half long, and one inch and a half broad, swelling in the middle, where is lodged one or two kidney-shaped seeds.

The tenth sort grows naturally in Siberia and Tartary; this grows with a shrubby stalk eight or ten feet high, sending out several branches which grow erect, covered with a smooth yellowish bark; the leaves have each two pair of oval pointed lobes, which stand upon short foot-stalks. The flowers are produced upon single foot-stalks which come out at the joints of the branches; they are yellow, and shaped like those of the Laburnum, but are smaller; these appear in May, and if the plants stand in a moist soil and shady situation, their pods will succeed the flowers, and the seeds will ripen the end of August.

The eleventh sort grows naturally in Siberia, from whence the seeds were sent to the Imperial Garden at Petersburg, where they succeeded and perfected seeds, which were afterward transmitted to many parts of Europe. This rises with a tree-like stem near twenty feet high, sending out many side branches, garnished with abrupt winged leaves composed of four or five pair of oval lobes placed opposite; the flowers are produced from the wings of the leaves, each foot-stalk having one yellow Pea-blossomed flower, which in a moist season is succeeded by oblong taper pods, containing three or four seeds in each.

The twelfth sort is also a native of Siberia; this is a weak low shrub, seldom rising more than three feet high in England. The branches are slender, and have a light bark, garnished with leaves composed of four oblong lobes which sit close to the branches; the flowers are produced singly upon foot-stalks which arise from the wings of the leaves; they are yellow, and

and appear in April, but are rarely succeeded by seeds in England.

The first sort is generally propagated in the English nurseries, by suckers taken from the roots of the old trees, or by cutting off some of the roots, and planting them upon a gentle hot-bed; these will put out shoots, and become plants; but these are not so valuable as those which are raised from seeds, because they do not make near so great progress in their growth, and are very subject to send forth many suckers from their roots, whereby the ground will be filled with them to a great distance; and these suckers will draw away the nourishment from the old plants, whereby their growth will be greatly retarded.

If this is propagated by seeds, they should be sown on a bed of light earth about the latter end of March or the beginning of April; and if the bed is well exposed to the sun, the plants will appear in about five or six weeks, and will require no farther care but to keep them clear from weeds. In this bed the plants may remain till the following spring, when they should be transplanted into a nursery about the latter end of March, placing them in rows at three feet distance row from row, and a foot and a half asunder in the rows. In this nursery they may remain two years, by which time they will be fit to transplant where they are designed to grow; for as these trees send forth long tough roots, so if they stand long unremoved, the roots will extend themselves to a great distance; therefore they must be cut off when the plants are transplanted, which sometimes occasions their miscarrying.

These trees will grow well upon almost every soil, but best in a light sandy ground, in which they will shoot six or eight feet in one year; and while the trees are young, they make an agreeable appearance, being well furnished with leaves; but when they are old, the branches being frequently broken by winds, render them unsightly, especially if they stand in an exposed place; and when the trees grow old, their branches decay, which renders them very disagreeable, and has occasioned their being rooted out of several gardens some years past. This is commonly known by the title of Locust-tree in America, and there are quantities of the seeds annually sent to England with that title.

The second sort is propagated in the same manner as the first, and the trees grow to the same size.

The third sort is at present scarce in the gardens about London, but in Devonshire it is in greater plenty, where the inhabitants give it the title of Raspberry plant, from the young shoots being covered with bristly hairs like the Raspberry plants; this does not produce seeds in England, so it is propagated by cutting off part of the roots, and planting them upon a gentle hot-bed, where they will put out fibres and shoots, and become new plants. This sort should have a warmer situation than the two former, though the ordinary winters in this country never injure it, but in very severe winters their young shoots are sometimes killed in exposed places. It loves a light moist soil.

The fourth, fifth, sixth, seventh, eighth, and ninth sorts, are tender, so cannot be maintained in England, unless they are placed in a stove in winter. These are propagated by seeds, which must be procured from the countries where they naturally grow, for they do not produce any here; these should be sown in small pots filled with earth from the kitchen-garden, and plunged into a hot-bed of tanners bark; if the seeds are good, the plants will appear in six weeks or two months; when these are fit to transplant, they should be carefully shaken out of the pots, and their roots separated; then each plant should be put into a small pot filled with the like earth, and plunged into a hot-bed of tanners bark, observing to shade them till they have taken new root, and then they must have the same treatment as other tender plants from the same countries.

While the plants are young, they are more tender than afterward, therefore it will be proper to keep them in the tan-bed in the stove the two or three first years; but when they have obtained strength, they may be kept in a dry stove of a temperate heat in winter, and in summer they may be exposed to the open air in a sheltered situation; with this management I have kept several of the species, some of which have produced flowers in the Chelsea Garden, and some of the sorts I have propagated by cuttings.

The tenth, eleventh, and twelfth sorts, are propagated from seeds, which should be sown in a shady situation in autumn, and then the plants will come up the following spring; but if the seeds are sown in the spring, the plants seldom rise the same season. When the plants come up, they will require no other care but to keep them clean from weeds till autumn, when, if they have made any progress, they should be transplanted on a north border, at about six inches distance, where they may grow two years, and then should be planted where they are to remain, which should be in a cool moist soil, not too much exposed to the sun.

RONDELETIA. Plum. Nov. Gen. 13. tab. 12. Lin. Gen. Plant. 206.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, sitting upon the germen, cut into five acute points. It has one funnel-shaped petal, with a cylindrical tube longer than the empalement, bellied toward the top, and cut into five roundish segments at the brim, which are reflexed. It has five awl-shaped stamina, terminated by single summits; the roundish germen is situated under the flower, supporting a slender style the length of the tube, crowned by an obtuse stigma. The germen afterward becomes a roundish crowned capsule with two cells, inclosing two or three angular seeds in each.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. RONDELETIA (*Americana*) foliis sessilibus, panicula dichotoma. Lin. Sp. Plant. 243. *Rondeletia with leaves sitting close to the branches, and a forked panicle. Rondeletia arborescens, tini facie. Plum. Nov. Gen. 15. Tree-like Rondeletia having the appearance of Tinus.*

2. RONDELETIA (*Asiatica*) foliis petiolatis, oblongis acutis. Flor. Zeyl. 80. *Rondeletia with oblong leaves growing upon foot-stalks. Cupi. Hort. Mal. 2. p. 37.*

The first sort grows naturally in the West-Indies, where Plumier discovered it, and gave it this title in honour of Gulielmus Rondeletius, a famous physician and natural historian of Montpellier.

The seeds of this plant were first sent me by Mr. Robert Millar, who collected them on the north side of the island of Jamaica; he also observed the trees growing plentifully in the Spanish West-Indies; I have also since received the seeds from Barbadoes, which have succeeded at Chelsea. This rises with a woody stalk ten or twelve feet high, branching out on every side; the branches are covered with a smooth greenish bark, and are garnished with oblong leaves ending in acute points; they are entire, and sit very close to the branches; the upper surface is of a lucid green, and the under of a pale green; they are a little crumpled on their surface, and stand alternate. The flowers come out in bunches at the end of the branches, they are white and have little scent. These appear in autumn, and are not succeeded by seeds in England.

The second sort grows naturally at Malabar; this rises with a woody stalk six or seven feet high, dividing into several branches, which are covered with a smooth bark, and garnished with stiff oblong leaves of a lucid green, standing alternate on the lower part of the branches, but by pairs toward the extremity; they have short foot-stalks, and are entire. The flowers are produced in large bunches at the end of the branches; they are of a yellowish white colour, and

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have a fragrant odour: these are succeeded by roundish capsules having two cells, each containing three or four angular seeds.

These plants being very tender, cannot be preserved in England, unless they are kept in a warm stove. They are propagated by seeds, which should be sown on a hot-bed early in the spring; and when the plants are come up and fit to remove, they must be transplanted into separate small pots, and plunged into a moderate hot-bed of tanners bark, where they must be treated in the same manner as hath been directed for other tender plants from the same country; in winter they must be placed in the tan-bed in the stove, where these plants will thrive, and in two or three years will flower, when they will make an agreeable variety amongst other tender exotic plants, for they retain their leaves all the year; and those of the second sort being of a lively green, make a fine appearance at all seasons.

ROOT, in Latin Radix.

A Root is that part of a plant, by which it naturally draws in its nourishment. The Roots of plants being of various forms, and each distinguished by a different name, it will not be improper, in this place, to insert the principal of those which are thus distinguished. And first,

A fibrous Root, Radix fibrosa, is that which consists wholly of small fibres, as most sorts of Grasses, Pinks, &c.

A tuberous Root, Radix tuberosa, is that which consists of an uniform fleshy substance, and is of a roundish figure, as Turneps, Potatoes, &c.

A bulbous Root, Radix bulbosa, is that which consists either of several coats involving one another, as Onions, Tulips, &c. or of several scales lying over one another, as Lilies, Crown Imperials, &c. The first of these is called a tunicated Root, the last a squamous Root.

A testiculated Root, Radix testiculato, is a double tuberose Root, for it consists of two knobs, resembling a pair of testicles, as in the Orchis.

A handed Root, Radix palmata, is a tuberose Root divided, as it were, into several fingers, as in the handed Satyrions.

A grumous Root, Radix grumosa, is that which is composed of several knobs, as the Anemone, &c.

A granulous Root, Radix granulata, is a kind of grumous Root, with small knobs resembling so many grains of Corn, as in the white Saxifrage.

A tap Root is a tuberose Root extended in length, as in Parsneps, Carrots, &c.

ROSA. Tourn. Inst. R. H. 636. tab. 408. Lin. Gen. Plant. 556. The Rose-tree.

The CHARACTERS are,

The empalement of the flower is of one leaf, divided into five parts at the top, but the base is globular and bell-shaped. The segments are spear-shaped, two of these alternately have appendixes on their sides, two other alternately are naked, and the fifth has often an appendix, and sometimes none. The flower hath five oval heart-shaped petals inserted in the empalement, and a great number of short hair-like stamina inserted in the neck of the empalement, terminated by three-cornered summits. It hath many germen situated in the bottom of the empalement, each having a short hairy style, inserted to the side of the germen, crowned by obtuse stigmas. The fleshy base of the empalement afterward becomes a top-shaped coloured fruit with one cell, including many hairy oblong seeds fastened on each side to the empalement.

This genus of plants is ranged in the fifth section of Linnæus's twelfth class, which contains those plants whose flowers have many stamina inserted in the empalement, and many styles.

The SPECIES are,

1. ROSA (Canina) germinibus ovatis pedunculisque glabris, caule petiolisque aculeatis. Lin. Sp. Plant. 704. Wild Rose with an oval fruit, having a smooth foot-stalk and prickly branches. Rosa sylvestris vulgaris, flore odorato incarnato. C. B. P. 483. Common wild Rose,

with a flesh-coloured sweet flower, commonly called Wild Briar, Dog Rose, or Hep-tree.

2. ROSA (Spinosissima) germinibus ovatis glabris, pedunculis caule petiolisque aculeatissimis. Lin. Sp. Plant. 705. Wild Rose with oval smooth fruit, but the stalks and foot-stalks extremely armed with spines. Rosa campestris spinosissima, flore albo odorato. C. B. P. 483. Wild prickly Rose with a white sweet flower, commonly called the Burnet-leaved Rose.
3. ROSA (Villosa) germinibus globosis aculeatis, pedunculis hispidis, caule aculeis sparsis, petiolis aculeatis, foliis tomentosis. Lin. Sp. 704. Rose with a globular prickly fruit and foot-stalk, and woolly leaves whose foot-stalks are prickly. Rosa sylvestris pomifera major. C. B. P. 484. The greater, wild, Apple-bearing Rose.
4. ROSA (Eglanteria) germinibus globosis pedunculisque glabris, caule aculeis sparsis rectis, petiolis scabris, foliolis acutis. Lin. Sp. 703. Rose with a globular fruit, a smooth foot-stalk, the stalk armed with erect spines, the leaves pointed, having rough foot-stalks. Rosa sylvestris, foliis odoratis. C. B. P. 483. Wild Rose with sweet-scented leaves, commonly called Sweet Briar.
5. ROSA (Scotica) caule petiolisque aculeatis, foliis pinnatis, foliolis apice incis, fructu globoso. Rose with the stalk and foot-stalk armed with spines, winged leaves whose lobes are cut at their points, and a globular fruit. Rosa pimpinella minor Scotica, flore livide rubente. Edit. prior. Small, Scotch, Burnet-leaved Rose, with a livid red flower.
6. ROSA (Inermis) caule inermi, pedunculis hispidis, calycis foliolis indivisis, fructibus oblongis. Rose with a smooth stalk, a prickly foot-stalk to the flower, the small leaves of the empalement undivided, and oblong fruit. Rosa campestris, spinis carens, biflora. C. B. P. 484. Unarmed Rose having two flowers.
7. ROSA (Hispanica) foliis utrinque villosis, calycis foliolis acutè ferratis, fructu glabro. Rose with leaves which are hairy on both sides, the small leaves of the empalement sharply sawed, and a smooth fruit.
8. ROSA (Scandens) caule aculeato, foliis perennantibus lucidis, flore odorato. Climbing Rose with a prickly stalk, shining evergreen leaves, and a sweet flower. Rosa sylvestris dumetorum scandens sempervirens, myrti folio lucido, flore albo odorato, fructu parvo rotundo & hispido. Mich. Cat. Pl. Ag. Flor. Wild, woody, climbing Rose, with a shining evergreen Myrtle leaf, a white sweet-scented flower, and a small, round, prickly fruit.
9. ROSA (Sempervirens) germinibus ovatis pedunculisque hispidis, caule petiolisque aculeatis. Lin. Sp. Plant. 704. Evergreen Rose with an oval germina, whose foot-stalks are prickly. Rosa moschata sempervirens. C. B. P. 482. Evergreen Musk Rose.
10. ROSA (Virginiana) inermis, foliis pinnatis, foliolis ovatis ferratis utrinque glabris, calycis foliolis indivisis. Rose without thorns, having winged leaves which are smooth on both sides, and the leaves of the empalement undivided. Rosa sylvestris Virginiana pimpinellæ majoris foliis. Raii Hist. Wild Virginia Rose with greater Burnet leaves.
11. ROSA (Lutea) caule aculeato, foliis pinnatis, foliolis ovatis ferratis utrinque glabris, pedunculis brevissimis. Rose with a prickly stalk, winged leaves having oval sawed lobes which are smooth on both sides, and short foot-stalks to the flower. Rosa lutea simplex. C. B. P. 483. The single Yellow Rose.
12. ROSA (Punicea) caule aculeato, foliis pinnatis, foliolis rotundioribus ferratis, petalis emarginatis bicoloribus. Rose with a prickly stalk, winged leaves having rounder sawed lobes, the petals of the flower indented at the top, and of two colours. Rosa punicea. Corn. Can. 11. The Austrian Rose.
13. ROSA (Moschata) caule aculeato scandente, foliis fenis glabris, floribus umbellatis. Rose with a prickly climbing stalk, leaves having seven smooth lobes, and flowers growing in umbels. Rosa moschata major. J. B. 2. p. 45. Greater Musk Rose.
14. ROSA (Centifolia) germinibus ovatis pedunculisque hispidis, caule hispido aculeato, petiolis inermibus. Lin. Sp. 704. Rose with an oval germen, stinging foot-stalks,

stalks, and the foot-stalks of the leaves smooth. Rosa entifolia Batavica. Clus. Hist. 1. p. 114. The Dutch undred-leaved Rose.

15. ROSA (Damascena) caule aculeato, pedunculis hispidis, calycibus pinnatifidis hirsutis. Rose with a prickly stalk, bristly foot-stalks to the flowers, and wing-pointed hairy empalements. Rosa Damascena. Lob. Icon. 206. Damask Rose.

16. ROSA (Alba) germinibus ovatis glabris, pedunculis hispidis, caule petiolisque aculeatis. Lin. Sp. 705. Rose with a smooth oval germen, whose foot-stalks are stinging and the branches prickly. Rosa alba vulgaris major. C. B. P. 482. Common great White Rose.

17. ROSA (Belgica) caule aculeato, foliis subtus hirsutis, calycibus semipinnatis villosis. Rose with a prickly stalk, leaves which are hairy on their under side, and half-winged hairy empalements to the flowers. Rosa Belgica five vitrea flore rubicante. Rea. Flor. The Blush Belgick Rose.

18. ROSA (Provincialis) caule petiolisque aculeatis, foliis subtus villosis, calycibus semipinnatis hispidis. Rose with prickly stalks and foot-stalks, leaves hairy on their under side, and bristly half-winged empalements. Rosa Provincialis major, flore pleno ruberrimo. Boerh. Ind. alt. 2. 252. Larger Provence Rose, with a very red double flower, commonly called Provence Rose.

19. ROSA (Incarnata) caule inermi pedunculis aculeatis, calycibus semipinnatis. Rose with an unarmed stalk, prickly foot-stalks, and half-winged empalements to the flowers. Rosa incarnata. Park. Par. The Blush Rose.

20. ROSA (Gallica) caule subinermi, foliis quinis subtus villosis, calycis foliolis indivisis. Rose with a stalk almost unarmed, leaves having five lobes, hairy on their under side, and the leaves of the empalement undivided. Rosa rubra. Ger. The Red Rose.

21. ROSA (Cinnamomea) germinibus globosis pedunculisque glabris, caule aculeis stipularibus, petiolis subinermibus. Lin. Sp. 703. Rose with a smooth globular fruit, prickly branches, and smooth foot-stalks to the leaves. Rosa odore cinnamomi, flore pleno. C. B. P. 483. The double Cinnamon Rose.

22. ROSA (Muscosa) caule petiolisque aculeatis, pedunculis calycibusque pilosissimis. Rose with armed stalks, the foot-stalks of the leaves and the empalements of the flower very hairy. Rosa rubra plena, spinosissima, pedunculo muscosa. Boerh. Ind. alt. 2. p. 252. The most thorny, double, Red Rose, with a mossy foot-stalk, commonly called Moss Provence Rose.

There are a great variety of double Roses now cultivated in the English gardens; most of them have been accidentally obtained from seeds, so that they must not be esteemed as distinct species, therefore I shall only insert their common names, by which they are known in the gardens, that those who are inclined to collect all the varieties, may be at no loss for their titles. The sorts before enumerated, I believe, are distinct species, as their specific characters are different, though it is difficult to determine which of them are really so; therefore I do not positively assert they are distinct species, though I have great reason to believe they are so.

The varieties of Garden Roses which are not before mentioned:

The Monthly Rose,
The striped Monthly Rose,
The York and Lancaster Rose,
Mrs. Hart's Rose,

} These are all supposed to be varieties of the Damask Rose.

The red Belgick Rose is supposed a variety of the Blush Belgick.

The single Velvet Rose,
The double Velvet Rose,
The Royal Velvet,

} These three are all varieties; the last I raised from the seeds of the pale Provence Rose.

The Childing Rose,
The Marbled Rose,
The double Virgin Rose,

} These three have great affinity with each other.

The Cabbage Provence is only a variety of the Common Provence.

The Blush or Pale Provence is a variety of the Red Provence.

The white Monthly } are varieties of the Damask Rose.
The white Damask }

The Frankfort Rose may be a distinct species, but is of little value; the flowers rarely open fair, and have no odour.

The double Sweet Briar
The evergreen Sweet Briar
The double bluish Sweet Briar,

} are varieties of the common sort.

The Austrian Rose with red and yellow flowers is only an accidental variety.

The double Yellow Rose is a variety of the single yellow.

The Rosa Mundi is a variety of the Red Rose.

The small, white, and semidouble white, are varieties of the common white.

The first here enumerated is very common in hedges in most parts of England, so is not cultivated in gardens. The Heps of this are used in medicine for making a conserve. The Bedeguar, which is a hairy spongy excrescence occasioned by the bite of small ichneumon flies, grows upon the stalks and branches of this plant, and sometimes upon other sorts of Roses. There are two or three varieties of this Rose commonly met with in hedges, one with a white, another with a red flower, and one with smooth leaves; the two first are evidently varieties, but I doubt if the last is not a distinct species.

The second sort grows naturally in many parts of England; this seldom rises above three feet high. The stalks are slender, and closely armed with small spines; the leaves are small, and are composed of three pair of roundish lobes terminated by an odd one; the flowers are white, and have an agreeable musky scent. This propagates fast by its creeping roots.

The third sort grows naturally in the northern counties in England; this rises with strong stalks to the height of seven or eight feet. The young branches are covered with a smooth brown bark; the spines are but few, and are very strong; the leaves are large, and hairy on both sides; they are composed of three pair of oblong oval lobes terminated by an odd one; these are deeply sawed on their edges; the flowers are large, single, and of a red colour; they appear the beginning of June, and are succeeded by large roundish Heps or fruit, which are set with soft prickles; they have a pleasant acid pulp surrounding the seeds, therefore are by some persons preserved, and made into a sweetmeat, which is served up in deserts to the table.

The fourth sort is the common Sweet Briar, which is so well known as to need no description; this is found growing naturally in some parts of Kent.

The fifth sort is the Dwarf Burnet-leaved Scotch Rose, of which there are two varieties, one with a variegated flower, and the flowers of the other are of a livid red colour; the latter is the same with the Rosa Alpina, pumila, montis rosarum, pimpinellæ foliis minoribus ac rotundioribus flore minimo livide rubente. Hort. Cath. for I have dried specimens of this which were sent me from Italy, and by comparing them with the Scotch Rose, I find they are the same. This sort seldom rises more than a foot high. The stalks are covered with a brown bark, and are closely armed with small spines; the leaves are very small, and have a resemblance to those of Burnet; the flowers are small, and sit close to the branches; the fruit is round, and of a deep purple colour, inclining to black when ripe.

The sixth sort rises to the height of six or seven feet. The stalks and branches have no spines, but are covered with a smooth reddish bark; the leaves are composed of three pair of thin oval lobes, terminated by an odd one; they are very smooth, of a bright green, and very slightly sawed on their edges, standing pretty far asunder upon the midrib; the foot-stalks of the flowers are armed with bristly hairs; the five leaves of the empalement are long, slender in the middle, but terminate in an oval leafy point; the flowers are single, of a bright red colour, and appear the beginning of May; these are succeeded by long spear-

spear-shaped Heps, which are smooth. The plants produce a second crop of flowers about the end of August, but these fall off, and are not succeeded by Heps.

The seeds of the seventh sort were sent me by Robert More, Esq; from Spain, where he found the plants growing naturally; this rises with strong upright stalks about four feet high, armed with strong thorns. The leaves are hairy on both sides; the lobes are roundish, and sawed on their edges; the small leaves of the empalement are acutely sawed; the flowers are single, of a bright red colour, and appear early in May; these are succeeded by large, smooth, roundish Heps, which ripen the end of August.

The eighth sort was discovered by Signior Micheli, growing naturally in the woods near Florence, who sent it to Dr. Boerhaave of Leyden, in whose curious garden I saw it growing in the year 1727: this hath slender stalks which trail upon the ground, unless they are supported, and, if trained up to a pole or the stem of a tree, will rise twelve or fourteen feet high; they are armed with crooked reddish spines, and garnished with small leaves, composed of three pair of oval acute-pointed lobes, terminated by an odd one; they are of a lucid green, and are sawed on their edges; they continue green all the year; the flowers are small, single, white, and have a musky odour; these in their natural place of growth continue in succession great part of the year, but their time of flowering in England is in June.

The ninth sort grows naturally in Spain; the seeds of this were sent me by Robert More, Esq; who found the plants growing there naturally. This rises with erect stalks four or five feet high, which are covered with a green bark, and armed with strong crooked white spines. The leaves are composed of five oval lobes ending in acute points; they are smooth, of a lucid green, and are slightly sawed on their edges; these continue all the year, and make a goodly appearance in winter. The flowers grow in large bunches or umbels at the end of the branches; they are single, white, and have a strong musky odour; they appear in August, and if the autumn proves favourable, will continue in succession till October.

The tenth sort grows naturally in Virginia and other parts of North America; this rises with several smooth stalks to the height of five or six feet. The young branches are covered with a smooth purple bark; the leaves are composed of four or five pair of spear-shaped lobes, terminated by an odd one; they are smooth on both sides, of a lucid green on their upper side, but pale on their under, and are deeply sawed on their edges; the flowers are single, of a livid red colour, and appear in July; the empalement is divided into five long narrow segments which are entire. This is kept in gardens for the sake of variety, but the flowers have little scent.

The eleventh sort is the single Yellow Rose; this hath weak stalks which send out many slender branches, closely armed with short, crooked, brown spines. The leaves are composed of two or three pair of oval thin lobes, terminated by an odd one; they are smooth, of a light green, and are sharply sawed on their edges; the flowers grow upon short foot-stalks; they are single, and of a bright yellow colour, but have no scent.

The twelfth sort is commonly called the Austrian Rose. The stalks, branches, and leaves are like those of the last, but the leaves are rounder; the flowers are larger; the petals have deep indentures at their points; they are of a bright yellow within, and of a purplish copper colour on the outside; they are single, have no scent, and soon fall away. There is frequently a variety of this with yellow flowers upon one branch, and copper colour upon another. This sort of Rose loves an open free air and a northern aspect.

The thirteenth sort is the Musk Rose; this rises with weak stalks to the height of ten or twelve feet, covered with a smooth greenish bark, and armed with

short strong spines. The leaves are smooth, and composed of three pair of oval spear-shaped lobes, terminating in points ending with an odd one; they are of a light green colour, and sawed on their edges; the flowers are produced in large bunches, in form of umbels, at the end of the branches; these appear in August, and continue in succession till the frost stops them; they are white, and have a fine musky odour. There is one with single, and another with double flowers of this sort. The stalks of these plants are too weak to support themselves, so the plants should be placed where they may have support.

The fourteenth sort is the Dutch hundred-leaved Rose; this rises with prickly stalks about three feet high. The leaves have sometimes three, and at others five lobes; the lobes are large, oval, smooth, and of a dark green with purple edges; the foot-stalk of the flower is set with brown bristly hairs; the empalement of the flower is smooth, and half winged; the flowers are very double, and of a deep red colour, but have little scent.

The fifteenth is the Damask Rose; this rises with prickly stalks eight or ten feet high, covered with a greenish bark, and armed with short spines. The leaves are composed of two pair of oval lobes, terminated by an odd one; they are of a dark green on their upper side, but pale on their under; the borders frequently turn brown, and are slightly sawed; the foot-stalks of the flowers are set with prickly hairs; the empalement of the flower is wing-pointed and hairy; the flowers are of a soft pale red, and not very double, but have an agreeable odour; the Heps are long and smooth.

The sixteenth is the common large White Rose, so well known as to need no description. Of this there are two varieties, one with a half double flower, having but two or three rows of petals, and the other has a smaller flower, and the shrub is of lower growth.

The seventeenth sort is called the Blush Belgick Rose; this rises about three feet high, with prickly stalks. The leaves are composed either of five or seven lobes, which are oval, hairy on their under side, and slightly sawed on their edges; the foot-stalks of the flowers and the empalements are hairy, and without spines; the empalements are large and half-winged; the flowers are very double, of a pale flesh colour, and have but little scent. It generally produces great quantities of flowers. The red Belgick Rose differs from this only in the colour of the flower, which is of a deep red.

The eighteenth sort is the common Provence Rose, which is well known in the English gardens, being cultivated in great plenty in the nurseries, and is one of the most beautiful sorts yet known. The flowers of this sort are sometimes very large, and the petals are closely folded over each other like Cabbages, from whence it is called the Cabbage Rose. The flowers of this sort of Rose have the most fragrant odour of all the sorts, therefore is better worth propagating.

The nineteenth sort is the Blush Rose. The stalks of this rise from three to four feet high, and are not armed with spines; the leaves are hairy on their under side; the foot-stalks of the flowers are armed with some small spines; the empalement of the flower is half-winged; the flowers have five or six rows of petals which are large, and spread open; they are of a pale bluish colour, and have a musky scent.

The twentieth sort is the common Red Rose, which is used in medicine. The stalks of this sort grow erect, and have scarce any spines; they rise from three to four feet high; the leaves are composed of three or five large oval lobes, which are hairy on their under side; the small leaves of the empalement are undivided; the flowers are large, but not very double, spread open wide, and decay soon; they are of a deep red colour, and have an agreeable scent. The Rosa Mundi is a variety of this with striped flowers.

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The twenty-first sort is the double Cinnamon Rose; this is one of the smallest flowers, and the earliest of all the kinds. The stalks rise about four feet high, are covered with a purplish smooth bark, and have no spines, but at the joints immediately under the leaves, where they are placed by pairs; they are short and crooked. The leaves are composed of three pair of oval lobes terminated by an odd one; they are hairy on their under side, and are sawed on their edges; the leaves of the empalement of the flower are narrow and entire; the flower is small, double, and has a scent like Cinnamon, from whence it had the title of Cinnamon Rose.

The twenty-second sort is called the Moss Provence Rose, from the resemblance which the flowers of this have to those of the common Provence Rose, yet it is undoubtedly a distinct species; for although the stalks and shoots of this are very like those of the common, yet the plants are difficult to propagate, which the common sort is not. This very rarely sends up suckers from the root, and when the branches are layed down, they are long before they put out roots, so that this sort has been frequently propagated by budding it upon stocks of other sorts of Roses, but the plants so raised are not so durable as those which are propagated by layers.

The stalks and branches of this sort are closely armed with brown spines; the foot-stalks of the flowers and the empalements are covered with long hair like Moss; the flowers are of an elegant crimson colour, and have a most agreeable odour.

Most of the sorts of Roses are of foreign growth, and have been at various times introduced into the English gardens, but they are generally natives of northern countries, or grow upon the cold mountains in the warmer parts of Europe, so they are very hardy in respect to cold, but love an open free air, especially the Yellow Rose, the Austrian Rose, and the Monthly Rose. The two former will not flower in a warm soil and situation, nor near the smoke of London, and the Monthly Rose will flower much better in a free open air, than within the reach of the smoke of London.

The usual time of these shrubs producing their flowers is from the middle, or latter end of May, till the middle of July.

But in order to continue these beauties longer than they are naturally disposed to last, it is proper to plant some of the Monthly Roses near a warm wall, which will occasion their budding at least three weeks or a month before those in the open air; and, if you give them the help of a glass before them, it will bring their flowers much forwarder, especially where dung is placed to the back side of the wall (as is practised in raising early fruits;) by this method I have seen fair Roses of this kind blown in February, and they may be brought much sooner against hot walls or in stoves, where people are curious this way.

You may also cut off the tops of such shoots which have been produced the same spring early in May, from some of these sorts of Roses which are planted in the open air, and upon a strong soil; this will cause them to make new shoots, which will flower late in autumn, as will also the late removing the plants in spring, provided they do not suffer by drought, as I have several times experienced; but particularly in the year 1718, when I had occasion to remove a large parcel of these plants in May, just as they were beginning to flower; in doing of which I cut off all the flower-buds, and, after having opened a trench where they were to be planted, I poured a large quantity of water, so as to render the ground like a pap; then I took up the plants, and placed them therein as soon as possible, that their roots might not dry; and, after planting them, I watered the ground well again, and covered the surface over with mulch to prevent the drying; after this I repeated watering the plants all over two or three times a week, in the evening, until they had taken root. In three weeks or a month after, the plants shot out again, and produced a

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great quantity of flowers in August and September, which were as fair as those produced in June. The Monthly Rose is the best sort for this purpose, there being no other sort which will flower both early and late so well as this.

The next sort of Rose which flowers in the open air, is the Cinnamon, which is immediately followed by the Damask Rose, then the Blush, York, and Lancaster come; after which, the Provence, Dutch, Hundred-leaved, White, and most other sorts of Roses follow; and the latest sorts are the Virginia and Musk Roses, which, if planted in a shady situation, seldom flower until September; and, if the autumn proves mild, will continue often till the middle of October.

The plants of the two sorts of Musk Roses, should be placed against a wall, pale, or other building, that their branches may be supported, otherwise they are so slender and weak as to trail upon the ground. These plants should not be pruned until spring, because their branches are somewhat tender; so that when they are cut in winter, they often die after the knife; these produce their flowers at the extremity of the same year's shoots in large bunches, so that their branches must not be shortened in the summer, lest thereby the flowers should be cut off. The shrubs will grow to be ten or twelve feet high, and must not be checked in their growth, if you intend they should flower well, so that they should be placed where they may be allowed room.

The lowest shrub of all the sorts here mentioned is the Scotch Rose, which rarely grows above a foot high, so that this must be placed among other shrubs of the same growth, which should have a moist soil and a shady situation. The Red Rose, and the Rosa Mundi, commonly grow from three to four feet high, but seldom exceed that; but the Damask, Provence, and Frankfort Roses grow to the height of seven or eight feet; so that in planting them, great care should be taken to place their several kinds, according to their various growth, amongst other shrubs, that they may appear beautiful to the eye.

The Yellow Rose, as also the Austrian Rose, are both natives of America; these were originally brought from Canada by the French; the other varieties, which are now in the gardens, of these sorts, have been accidentally obtained, and are preserved by budding them on the other sorts. The shrubs of these Roses seldom shoot so strong as most of the other sorts, especially in the light land near London, where they seldom produce their flowers. These are esteemed for their colour, being very different from all the other sorts of Roses; but as their flowers have no scent, and are of short duration, they do not merit the price they are generally sold at.

The Frankfort Rose is of little value, except for a stock to bud the more tender sorts of Roses upon, for the flowers seldom open fair, and have no scent; but it being a vigorous shooter, renders it proper for stocks to bud the Yellow and Austrian Roses, which will render them stronger than upon their own stocks; but the Yellow Roses seldom blow fair within eight or ten miles of London, though in the northern parts of Great-Britain they flower extremely well. This sort must have a northern exposure, for if it is planted too warm, it will not flower.

The Damask and Monthly Rose seldom flower well in small confined gardens, nor in the smoke of London, therefore are not proper to plant in such places, tho' they frequently grow very vigorously there. These always begin to shoot the first of any of the sorts in the spring, therefore frequently suffer from frosts in April, which often destroys all their flowers.

All the sorts of Roses may be propagated either from suckers, layers, or by budding them upon stocks of other sorts of Roses; which latter method is only practised for some peculiar sorts, which do not grow very vigorous upon their own stocks, and send forth suckers very sparingly, or where a person is willing to have more sorts than one upon the same plant;

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but

but where this is designed, it must be observed to bud only such sorts upon the same stock as are nearly equal in their manner of growth; for if there be a bud of a vigorous growing sort, and others of weak growth budded in the same stock, the strong one will draw all the nourishment from the weaker, and entirely starve them.

If these plants are propagated by suckers, they should be taken off annually in October, and transplanted out either into a nursery in rows (as hath been directed for several other sorts of flowering-shrubs) or into the places where they are to remain; for if they are permitted to stand upon the roots of the old plants more than one year, they grow woody, and do not form so good roots as if planted out the first year, so there is more danger of their not succeeding.

But the best method to obtain good-rooted plants is to lay down the young branches in autumn, which will take good root by the autumn following (especially if they are watered in very dry weather,) when they may be taken from the old plants, and transplanted where they are to remain. The plants, which are propagated by layers, are not so apt to send out suckers from their roots as those which are from suckers, therefore should be preferred before them; because they may be much easier kept within compass, and these will also flower much stronger. These plants may be transplanted any time from October to April; but when they are designed to flower strong the first year after planting, they should be planted early; though, as I said before, if they are planted late in the spring, it will cause them to flower in autumn, provided they do not suffer by drought.

Most of these sorts delight in a rich moist soil and an open situation, in which they will produce a greater quantity of flowers, and those much fairer, than when they are upon a dry soil or in a shady situation. The pruning which they require, is only to cut out their dead wood, and take off all the suckers, which should be done every autumn; and if there are any very luxuriant branches, which draw the nourishment from the other parts of the plant, they should be taken out, or shortened, to cause them to produce more branches, if there be occasion for them to supply a vacancy; but you must avoid crowding them with branches, which is as injurious to these plants as to fruit-trees; for, if the branches have not equal benefit from the sun and air, they will not produce their flowers so strong, nor in so great plenty, as when they are more open, and better exposed to the sun, so that the air may circulate the more freely between them.

ROSA SINENSIS. See HIBISCUS.

ROSE THE GUELDER. See OPULUS.

ROSMARINUS. Tourn. Inst. R. H. 195. tab. 92. Lin. Gen. Plant. 35. [so called of Ros, Dew, and Marinus, Lat. belonging to the sea, q. d. Sea Dew, as some say, because formerly growing in great plenty near the shore of the Mediterranean Sea; the vapours thence arising, used to fall on it in the manner of Dew.] Rosemary.

The CHARACTERS are,

The flower has a tubulous empalement of one leaf, compressed at the top, the mouth erect, and divided into two lips; the upper lip is entire, and the under bifid. It hath one petal; the tube is longer than the empalement; the brim is ringent; the upper lip is short, erect, and divided into two parts, whose borders are reflexed; the lower lip is reflexed, and cut into three parts, the middle segment being larger and concave. It hath two awl-shaped stamina inclining toward the upper lip, terminated by single summits, and a four-pointed germen; with a style the shape, length, and in the same situation with the stamina, crowned by an acute stigma. The germen afterward become four oval seeds sitting in the bottom of the empalement.

This genus of plants is ranged in the first section of Linnæus's second class, which includes those plants whose flowers have two stamina and one style; so that this genus, by his system, with six or seven more,

are removed to a great distance from their congeners, which are ranged in his fourteenth class.

The SPECIES are,

1. ROSMARINUS (*Angustifolia*) foliis linearibus marginibus reflexis, subtus incanis. *Rosemary with linear leaves which are reflexed on their edges, and hoary on their under side.* Rosmarinus hortensis, angustiore folio. C. B. P. 217. *Garden Rosemary with a narrower leaf.*
2. ROSMARINUS (*Latifolia*) foliis linearibus obtusis, utrinque virentibus. *Rosemary with obtuse linear leaves which are green on both sides.* Rosmarinus spontaneus latiore folio. C. B. P. 217. *Broad-leaved wild Rosemary.*

These two sorts have been frequently supposed the same, and the difference accidental; but I have long cultivated both, and have raised them from seeds without finding them vary, so I believe they are distinct species. The leaves of the second sort are broader than those of the first, and their points are obtuse; the flowers are also much larger, and of a deeper colour, and the stalks grow larger, and spread out their branches wider, and the whole plant has a stronger scent. These differences the gardeners, who cultivate the plants for the market, observe.

There are two other varieties of these plants, one of the first sort with striped leaves, which the gardeners call the Silver Rosemary, and is at present rare in the English gardens; all the plants of this which were here before the severe winter in 1740, having been then killed; the other is of the second sort, which is striped with yellow; this the gardeners called the Gold striped Rosemary. The plants of this sort are pretty hardy, so will live in the open air through our common winters if they are upon a dry soil.

These plants grow plentifully in the southern parts of France, in Spain and Italy, where, upon dry rocky soils near the sea, they thrive prodigiously, and perfume the air, so as to be smelt at a great distance from the land; but, notwithstanding they are produced in warm countries, yet they are hardy enough to bear the cold of our ordinary winters very well in the open air, provided they are planted upon a poor, dry, gravelly soil, on which they will endure the cold much better than upon a richer soil, where the plants will grow more vigorously in summer, and so be more subject to injury from frost, and they will not have so strong an aromatic scent as those upon a dry barren soil.

Those sorts with striped leaves are somewhat tender, especially that with silver stripes, so should either be planted near a warm wall, or in pots filled with light fresh earth, and sheltered in winter under a frame, otherwise they are subject to die in frosty weather.

These sorts may be propagated by planting slips or cuttings of them in the spring of the year, just before the plants begin to shoot, upon a bed of light fresh earth; and when they are rooted, they may be transplanted into the places where they are designed to grow; but it will be proper to do this about the beginning of September, that they may take new root before the frosty weather comes on; for if they are planted too late in the autumn, they seldom live thro' the winter, especially if the weather proves very cold; so that if you do not transplant them early, it will be the better method to let them remain unremoved until March following, when the frost is over, observing never to transplant them at a season when the dry east winds blow, but rather defer the doing of it until the season is more favourable; for, if they are planted when there are cold drying winds, their leaves are apt to dry up, which often kills them; but, if there happen to be some warm showers soon after they are removed, it will cause them to take root immediately, so that they will require no farther care but to keep them clear from weeds.

Although these plants are tender when planted in a garden, yet when they are by accident rooted in a wall (as I have several times seen them,) they will endure the greatest cold of our winters, though exposed much to the cold winds; which is occasioned by

Rubia Tinctorum Madder.



RUBIA, foliis senis Hort. Cliff. 35.

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the plants being more stunted and strong, and their roots being drier.

The flowers of the narrow-leaved garden fort are used in medicine, as are also the leaves and seeds.

ROYENA. Lin. Gen. Plant. 491.

The title of this genus was given to it by Dr. Linnæus, in honour of Dr. Adrian Van Royen, late professor of botany at Leyden in Holland.

The CHARACTERS are,

The flower has a bellied permanent empalement of one leaf, whose mouth is obtuse and five-pointed. It is of one petal, having a tube the length of the empalement, but the brim is divided into five segments which turn back. It hath ten short stamina growing to the petal, terminated by oblong, erect, twin summits the length of the tube, and an oval hairy germen sitting upon two styles a little longer than the stamina, crowned by single stigmas. The empalement afterward turns to an oval capsule with four furrows, having one cell with four valves, containing four oblong triangular seeds.

This genus of plants is ranged in the second section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and two styles.

The SPECIES are,

1. ROYENA (*Lucida*) foliis ovatis scabriusculis. Hort. Cliff. 149. *Royena with oval rough leaves.* Staphylodendrum Africanum, folio singulari lucido. Herm. Parad. 232. *African Bladder-nut with a single shining leaf.*
2. ROYENA (*Glabra*) foliis lanceolatis glabris. Prod. Leyd. 441. *Royena with smooth spear-shaped leaves.* Vitis Idæa Æthiopica, buxi minoris folio, floribus albis. Hort. Amst. 1. p. 125. *Ethiopian Whortleberry, with a smaller Box leaf and white flowers.*
3. ROYENA (*Hirsuta*) foliis lanceolatis hirsutis. Prod. Leyd. 441. *Royena with hairy spear-shaped leaves.* Staphylodendrum Africanum, folio lanuginoso rosmarini lator. Boerh. Ind. alt. 2. p. 235. *African Bladder-nut, with a broader, downy, Rosemary leaf.*

The first sort has been long an inhabitant of some curious gardens in England, but it is not very common here, being very difficult to propagate.

This plant grows eight or ten feet high, and puts out its branches on every side, so may be trained up to a regular head: the branches are clothed with oval shining leaves, which are placed alternately, and continue all the year, so make an agreeable variety among other exotic plants in the green-house, during the winter season. The flowers are produced from the wings of the leaves along the branches, but as they have little beauty, few persons regard them. I have not observed any fruit produced by these plants in England.

The second sort grows naturally at the Cape of Good Hope; this rises with a shrubby stalk five or six feet high, sending out many slender branches, covered with a purplish bark, and garnished with small oval leaves less than those of the Box-tree; they are smooth, entire, and of a lucid green, continuing all the year. The flowers come out from the wings of the leaves round the branches, they are shaped like a pitcher, and are white; these are succeeded by roundish purple fruit, which ripen in the winter.

The third sort grows naturally at the Cape of Good Hope; this rises with a strong woody stalk seven or eight feet high, covered with a gray bark, sending out many small branches alternately, which are garnished with spear-shaped leaves about an inch long, and a quarter broad in the middle; they are hoary, and are covered with soft hairs. The flowers come out upon short foot-stalks from the side of the branches; they are of a worn-out purple colour and small. They appear in July, but are not succeeded by seeds in England.

These plants are too tender to live through the winter in the open air in England, therefore they must be removed into the green-house in autumn, and treated in the same way as Orange-trees, with which culture the plants will thrive. The first and third sorts are difficult to propagate here, for the branches which are laid down seldom put out roots, and those

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which do, are two or three years before they will have made roots sufficient to transplant, and their cuttings very rarely succeed; and these being the only methods by which they can be increased in those countries, where they do not produce seeds, are usually practised. The best time to plant the cuttings, is early in the spring; these should be planted in small pots filled with soft loamy earth, and plunged into a very moderate hot-bed. The pots should be closely covered down with hand-glasses to exclude the external air, and the cuttings refreshed with a little water every eighth or tenth day, according as the earth becomes dry, for much moisture will kill them. If the cuttings shoot, they must be gradually inured to bear the open air, and when they are well rooted, they should be each planted in a separate small pot, and afterward treated as the old plants.

If the plants put out any young shoots from the bottom, they should be carefully laid down in the ground while young, because when the shoots are tender they are more apt to put out roots, than after they are become woody and hard; these branches should be slit in the same manner as is practised in laying of Carnations: they must be frequently, but gently watered, during the warm weather in summer, but in cold weather it must be sparingly given them; when these are rooted, they may be taken off, and treated in the same way as the cuttings.

The second sort is very apt to send up suckers from the roots, which may be taken off with the roots, and thereby increased; or those which do not put out roots, may be laid down in the same manner as the former; and the cuttings of this more frequently succeed than those of the other, so that this sort is much easier propagated.

RUBEOLA. See ASPERULA, GALLIUM, and SHERARDIA.

RUBIA. Tourn. Inst. R. H. 113. tab. 38. Lin. Gen. Plant. 119. [takes its name from its red colour, because the root of this plant is used in dyeing a red colour.] Madder; in French, *Garance*.

The CHARACTERS are,

The empalement of the flower is small, cut into four segments, and sits upon the germen. The flower has one bell-shaped petal having no tube, but is divided into four parts. It hath four awl-shaped stamina which are shorter than the petals, terminated by single summits; and a twin germen under the flower, supporting a slender style divided into two parts upward, and crowned by two headed stigmas. The germen afterward become two smooth berries joined together, each having one roundish seed with a navel.

This genus of plants is ranged in the first section of Linnæus's fourth class, which contains those plants whose flowers have four stamina and one style.

The SPECIES are,

1. RUBIA (*Tinctorum*) foliis senis lanceolatis supernè glabris. Madder with six spear-shaped leaves in whorls, whose upper surfaces are smooth. Rubia tinctorum sativa. C. B. P. 333. *Cultivated Dyer's Madder.*
2. RUBIA (*Sylvestris*) foliis inferioribus senis, supernè quaternis binisve, utrinque asperis. Madder with the lower leaves growing by sixes round the stalks, and the upper ones by fours or pairs, which are rough on both sides. Rubia sylvestris aspera, quæ sylvestris Dioscoridis. C. B. P. 333. *Rough wild Madder of Dioscorides.*
3. RUBIA (*Peregrina*) foliis quaternis. Prod. Leyd. 254. Madder with four leaves which are placed round the stalks. Rubia quadrifolia asperrima lucida peregrina. H. L. 523. *Foreign four-leaved Madder, with shining rough leaves.*

The first sort which is cultivated for the root, which is used in dyeing and staining of linens, grows naturally in the Levant. This hath a perennial root and an annual stalk; the root is composed of many long, thick, succulent fibres, almost as large as a man's little finger; these are joined at the top in a head, like the roots of Asparagus, and root very deep into the ground; I have taken up roots, whose strong fibres have been more than three feet long; from the upper part

part (or head of the root) come out many side roots, which extend just under the surface of the ground to a great distance, whereby it propagates very fast; for these send up a great number of shoots, which, if carefully taken off in the spring, soon after they are above ground, become so many plants. These roots are of a dark colour on their outside, somewhat transparent, and have a yellowish red pith in the middle, which is tough and of a bitterish taste; from the root arise many large, four-cornered, jointed stalks, which in good land will grow five or six feet long, and, if supported, sometimes seven or eight; they are armed with short herbaceous prickles, and at each joint are placed five or six spear-shaped leaves, about three inches long, and near one broad in the middle, drawing to a point at each end; their upper surfaces are smooth, but their midrib on the under side are armed with rough herbaceous spines; the leaves sit close to the branches in whorls. From the joints of the stalk come out the branches, which sustain the flowers; they are placed by pairs opposite, each pair crossing the other; these have a few small leaves toward the bottom, which are by threes, and upward by pairs opposite; the branches are terminated by loose branching spikes of yellow flowers, which are cut into four segments resembling stars. These appear in June, and are sometimes succeeded by seeds which seldom ripen in England.

The second sort grows naturally in Spain, and in the south of France; this hath perennial roots like those of the first sort, but are much larger; the stalks of this are smaller than those of the first sort, and are almost smooth; their lower parts are garnished with narrow leaves, placed by sevens in whorls round the stalks, but upward they diminish to four, three, and two toward the top; these are rough on both sides; at each joint of the stalk comes out two short foot-stalks opposite, having two small rough leaves, and end with branching foot-stalks, sustaining small yellow flowers. This sort flowers the latter end of June, but does not produce seeds here.

The third sort grows naturally in Spain and the Balearic Islands; I received the seeds of this sort from Gibraltar, and also from Minorca, where the plants grew out of the crevices of the rocks. The roots of this sort are much smaller than those of the two former, but are less succulent; they strike deep into the ground, and send up several slender four-cornered stalks which are perennial; they grow a foot and a half long, and divide into many branches, whose joints are very near each other; they are garnished with short stiff rough leaves, placed by fours round the stalk; they are about an inch long, and half an inch broad in the middle, of a lucid green, and continue all the year. This hath not produced flowers in England.

There is a sort which grows naturally in Wales, and also upon St. Vincent's rock, which has four leaves at each joint, but these are narrower and longer than those of the third sort; the stalks of this are perennial, and the leaves evergreen; so that Mr. Ray has mistaken this plant, having supposed it to be the second, which hath annual stalks rising much higher, therefore I should rather think it might be the third sort, if they were equally hardy; but the third sort is so tender, as to be always killed by severe frosts in England, if exposed to the open air.

The first sort is that which is cultivated for the use of the dyers and callico printers, and is so essential to both manufactories, as that neither of those businesses can be carried on without this commodity; and the consumption of it is so great here, as that upon a moderate computation, there is annually so much of it imported from Holland, as the price of it amounts to more than one hundred and eighty thousand pounds sterling; which might be saved to the public, if a sufficient quantity of it were planted in England, where it might be cultivated to greater advantage than in Holland, the lands here being better adapted to grow this plant. But as the growing of this plant

in quantity, has been for several years discontinued, so the method of culture is not well known to many persons here; and as there is at present an inclination in the public to regain this lost branch of trade (for formerly there was not only enough of this commodity raised in England for our own consumption, but also great quantities of it were sent abroad,) so we shall here give a full account of the culture of the plant, and also of the method of preparing the root for use; and shall begin with the method now practised in Zealand, where the best and greatest quantity of Madder is now raised.

In all the Netherlands, there is no where better Madder cultivated, than in Schowen, one of the islands of Zealand, which is performed in the following manner:

The land which is designed for Madder, if it is strong and heavy, is ploughed twice in autumn, that the frost in winter may mellow it and break the clods; then it is ploughed again in the spring, just before the time of planting the Madder; but if the ground is light, then it is ploughed twice in the spring; at the last ploughing it is divided into lands of three feet broad, with furrows between each land four or five inches deep. Madder requires a loamy substantial soil, not too stiff and heavy, nor over light and sandy; for although it may thrive tolerably well in the latter, yet such land cannot have a second crop of Madder planted upon it in less than eight or ten years interval; but in Schowen, where the land is substantial, they need not stay longer than three or four years, in which interval the ground is sown with Corn, or planted with any kinds of pulse. It is granted, that the best land for producing of Madder is in Schowen, where a gemet of land, which is three hundred square rods of twelve feet each, will yield from one thousand pounds to three thousand pounds weight, according to the goodness of the land and the favourableness of the seasons; but in light land, the quantity is from five hundred to a thousand pounds weight.

The time for planting of Madder begins toward the end of April, and continues all May, and sometimes in very backward springs, there is some Madder planted the beginning of June. The young shoots from the sides of the root are taken off from the mother plant, with as much root as possible; these are called kiemen, and are planted with an iron dibble in rows at one foot asunder, and commonly four kiemen in a row.

The quantity of these slips (or kiemen) as is required to plant one gemet of land, are sold at different prices, according to the price which Madder bears, or to the demand for the plants; they are often sold from sixteen to twenty guilders, and sometimes they have been sold for ten to eleven pounds Flemish, but the lowest price is from fifteen guilders to three pounds Flemish.

The expence of planting out a gemet of land with slips (or kiemen) costs for labour only, from sixteen to twenty guilders, according as the land is heavy or light: there are generally employed six men to plant, two to rake the ground, these earn each a guilder a day; and five or six women or boys, called carpers or pluckers of the shoots or kiemen, these earn twelve Dutch pence a day, or two schillings.

The first year the Madder is planted, it is customary to plant Cabbages or Dwarf Kidney-beans, in the furrows between the beds, but there is always great care taken to keep the ground clean from weeds; this is generally contracted for at two pounds Flemish for each gemet of land.

In September or October, when the young Madder is cleaned for the last time that season, the green haulm (or stalks) of the plants, is carefully spread down over the beds, without cutting any part off, and in November the Madder is covered over the haulm with three or four inches of earth.

This covering of the Madder, is performed either with the plough or with the spade; if it is done by the

the first, it costs two guilders and a half, or three guilders in strong land each gemet, and over and above this, one guilder and a half to level the tops of the beds, and make them smooth; but it is better performed with the spade, only it is more chargeable, for that costs from eight to ten guilders each gemet, but at the same time the clods are broken, and the surface of the beds is made smooth and even.

The second year in the beginning of April, which is about the time the kiemen or young shoots are beginning to come out, the earth on the top of the beds should be scuffled over and raked, to destroy the young weeds, and make the surface smooth and mellow, that the kiemen may shoot out the easier above ground; this labour costs three shillings each gemet. The second summer there must be the same care taken to keep the Madder clean as in the first, and then nothing is planted in the furrows, or suffered to grow there; at the last time of cleaning the ground, in September or October, the green haulm is again spread down upon the beds; and in November the Madder is again covered with earth, in the same manner as the first year.

By this method of culture, one can see how necessary it is to plant the Madder in beds, for thereby it is much easier covered with the earth of the furrows; and hereby the earth of the beds is every time heightened, whereby the Madder roots will be greatly lengthened, and the kiemen or young shoots will have longer necks, and by being thus deeply earthed, will put out more fibres and have much better roots, without which they will not grow; and it is of equal use to the mother plants, for by this method the roots will be longer; and in this consists the goodness and beauty of the Madder, for those which have but few main roots, are not so much esteemed as those which are well furnished with side roots called tengels; a Madder plant that has many of these roots, is called a well bearded Madder plant; therefore one must never cut off these side roots, for by so doing there will be a less crop of Madder, and but few kiemen or young shoots can be produced; besides, by the loss of moisture, sometimes the plants will droop and become weak; and there is great profit in having a large quantity of kiemen to draw in the spring, which are in plenty the second and third years.

The Madder roots are seldom dug up the second year, but generally after it has grown three summers, therefore the culture of the third year is the same as in the second, during the spring and summer.

Before the first day of September, it is forbidden to dig up any Madder in this island; but on that day early in the morning, a beginning is made, and the person who carries the first cart load to the stove, has a premium of a golden rider, or three ducats.

The digging up the Madder of a gemet of land, costs from thirty-six to one hundred guilders, according to the goodness of the crop, and the lightness or stiffness of the ground, but in light land it costs from nine to ten pounds Flemish; the persons who are adroit in this business, are generally paid five shillings Flemish per day.

The Madder produces flowers in the middle of summer, and sometimes a few seeds, but they never ripen here; nor would they be of use to cultivate the plants, since it is so easily done by the kiemen.

Some years past they began to plant here the great wild Madder, which was called French Madder, but this was not esteemed so good for use as the tame Madder, from which it differs much, so that was not continued. The more bitter of taste the roots of the Madder are, when taken out of the ground before it is brought to the stove, the less it will lose of its weight in drying, and is the better afterward for use.

When the Madder is dug out of the ground, it is carried to the stove, and there laid in heaps; in that which is called the cold stove, and separated with hurdles made of wicker, and memorandums kept of each parcel, and to what countryman it belongs, that

each may be dried in their turns, and prepared or manufactured, for which turn generally lots are cast beforehand. The Madder thus carried to the stove is relzyn.

This relzyn is carried about six o'clock in the morning, into the tower or steeple, hoisted in baskets by ropes to the rooms, and divided or spread, where it remains till the next day, two or three o'clock in the morning, about twenty or twenty-one hours; then those roots which have lain in the hottest places are removed to cooler, and those in the cooler are removed to the hotter places nearer the oven. This is continued for four or five days, according as there has been more or less carried there; but it is always the goods of one person, that every one may have his own, and of as equal quality as possible, when it is delivered out.

When the Madder is sufficiently dried in the tower, then it is threshed on the threshing-floor, which is made clean from dirt or filth, and then it is brought to the kiln, and there spread on a hair-cloth for about twenty hours, during which time the kiln is made more or less hot, according as the roots are more or less thick, or the weather being more or less cold.

From the kiln the Madder is moved to the pounding-house, and is there pounded on an oaken block made hollow, with six stampers plated at the bottom with iron bands; these stampers are kept in motion by a mill very much resembling a grist mill, which is turned by three horses; the presence of the pounding-master is here always required, to stir the Madder continually with a shovel, to bring it under the stampers. When the Madder is thus properly pounded, it is sifted over a tub till there is enough to fill a cask: this first pounding, which chiefly consists of the thinnest and smallest roots, and the outside husks with some earth, which by drying and threshing could not be separated, is called mor mull.

What remains in the sieve is put on the block again, and pounded a second time, and when the pounding-master guesses a third part is pounded, then the Madder is taken out again and sifted over another tub, and put into a separate cask, and this is called gor gemeens; that which remains in this second operation, not enough pounded in the sieve, is for the third time put on the block, and pounded till it is all reduced to powder, which is called kor krap.

When the Madder is cleansed from the dirt and mull, and is entirely pounded at once, then it is called oor onberoofde, so that this onberoofde actually consists of the gemeens and krap pounded together, and sifted without separating them from each other.

When there is two thirds of krap, and one third gemeens, which was separately prepared or manufactured, then they are called two and one, or marked 2.

The sweepings of the stove, as also of the ground and beams being swept together is not lost, but is put amongst the mull, or sold by itself.

The sweepings of the mill, and every part of the pounding-place, is also gathered together, and put into a cask; this is called den beer.

When the Madder is thus prepared and put into casks, it is in Zealand examined by sworn assayers and tried, if it is not faulty packed up; that is, whether in the preparing it is properly manufactured, or falsely packed up, and to see if every part of the cask is filled with Madder of equal goodness and quality, not burned in the drying, or mixed with dirt; which the assayers by certain trials, and by weighing and washing of the Madder can know, if it is according to the statutes of the country.

There are sundry statutes made and published by the states of Zealand, concerning the preparing of Madder; as one of the 28th of July 1662, one on the 29th of September, and 31st of October 1671, another on the 23d of September 1699, and the last on the 28th of April 1735: by which statutes, among other things, it is strictly forbidden, That no person shall prepare krap, in which there shall be more than

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two pounds of dirt in a hundred weight; nor above eight pounds in the like weight of onberoofde, or in gemeens more than twelve pounds in a hundred weight.

If the Madder upon trial is found good, the arms of the city or village, and the sign of the stove where the Madder was prepared, is painted on the cask with black paint. The trial of the Madder is in no place more exact, or more religiously observed, than in the city of Zirkzee; therefore the merchants in Germany, who know this, always prefer the Madder of that place to all others, and will not buy any which has not the arms of Zirkzee painted upon the casks, if they are to be had.

We before mentioned the tower, the kiln, &c. where the Madder is dried and prepared for use, the draughts of these are exhibited in the annexed plates, with their explanation: but that a better judgment may be formed of their use, we shall here take notice, that the tower is the place where the Madder is first dried. This tower is heated by fifteen or sixteen pipes or flues of brick-work, which run on each side the tower under the floor, and are covered with low burnt tiles, some of which are loose; so that by taking up these, the heat is moderated and conducted to any part of the tower, the person who has the care of drying the Madder pleases.

The tower has four or five lofts made of strong laths; they are four or five feet above each other, upon which the Madder is laid; these are heated by an oven, which is placed in the room where the work people live, and is by them called the glory.

The kiln is in a room whose length is equal to the breadth of the stove, and is entirely arched over at the top; the oven by which the kiln is heated, is called the hog; this is built upon a stone wall, which rises a foot or two above ground; and the small arch by which the heat passes through every part, has several square little holes in the brick-work, that the heat may come out; over these holes, on the top of the kiln, are laid wooden laths the whole length, and upon them a hair-cloth, on which the Madder is laid to dry, before it is carried to the pounding-place. In the Madder-stoves there is no other fuel used but Friezland turf, which gives an equal and moderate heat.

In the Madder-stoves, the people work more by night than day; first, because at the time of the year when the Madder is brought into the stoves, the nights are much colder than the days; and secondly, that the master, who must be always attentive to his work, may not be interrupted by visitors; and thirdly, because they see less dust; but principally, because the Madder which is pounded in the night is of a much better colour than that which is pounded in the day.

In the Madder-stoves are always constant workmen, one who is the drier, who has the care of drying the Madder in the tower and the kiln; for the right performance of this, art and experience is required, the goodness of the Madder greatly depending on the right drying. This person is a sort of foreman, and has the direction of all the workmen; his pay is five stivers, for every hundred weight of Madder which is prepared in the stove; he has one person under him for his assistant, to perform part of the laborious work, and to be always at hand; this man is paid eighteen or nineteen shillings per week Flemish, which is the constant wages.

The third person is the pounder, who is always present when the Madder is pounding, who with a particular shovel which is small, and fitted to the cavity of the pounding-block, stirs the Madder from time to time, to bring it under the stampers; he is paid four stivers for every hundred weight of Madder.

The fourth is a driver, who with a team of three horses, causes the mill to turn and pound the Madder; his pay for himself and the three horses, from eight to nine stivers per hundred weight, according as he can bargain.

Besides these four, there are five other assistants, who

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lay the Madder on and take it off; this is often performed by the wives and boys of the other workmen; these five have fifty stivers for every three thousand pounds of Madder which is prepared, so they have each ten stivers.

There are nineteen or twenty Madder-stoves in the island of Schowen, which, at an average, prepare in one crop, that lasts from September to February, ten thousand weight of Madder each, which in the whole, amounts to two million pounds weight; and if we suppose, that the Madder is sold at an average for four pounds Flemish per hundred weight, which is a moderate price, one may soon reckon what advantage the culture of this dyeing commodity produces to this one island.

The countrymen pay to the owners of the Madder-stoves, two guilders for preparing every hundred weight of mull, and for each hundred weight of hard Madder; that is, of krap, gemeens, or onberoofde, three guilders, according as they will have them prepared.

The building of a Madder-stove quite new from the foundation, costs in the whole about twenty-four hundred pounds Flemish, which is twelve hundred pounds sterling.

PLATE I.

An explanation of the plan of the cold stove.

- Fig. 1. Is the lower band, whose thickness is fourteen by sixteen inches.
2. The upper band, which is twelve by fourteen inches.
3. The cap and band, which is ten by twelve inches.
4. The upper cap, which is six by seven inches.
5. The two main jambs, which are thirteen by fifteen inches of stone.
6. The half bands and posts, of nine by seven inches.
7. The uppermost half band, which is small, six by eight inches.

PLATE II.

A plan of the arched room cut through perpendicularly in the middle where the kiln stands, with a representation of the kiln.

- AA Is the cut of the arch.
- B The oven of the kiln, which is called the hog; this has no chimney; when the fire is first kindled either with turf or other fuel, the smoke is let out through a small window.
- CCC A stone foundation on which the oven and kiln is built.
- CC Is properly the kiln itself, which must be observed in what manner it is built, with little holes to let out the heat.
- DD Stone bands made for the greater firmness, about the kiln.
- EEEE Iron bars placed to strengthen the kiln, and also to lay the upper long lath upon.
- F Small cross laths over the kiln, which lie from one end C to the other end C upon the kiln, but there are few of these represented, that the small holes of the kiln may better appear.
- G The door of the entrance.

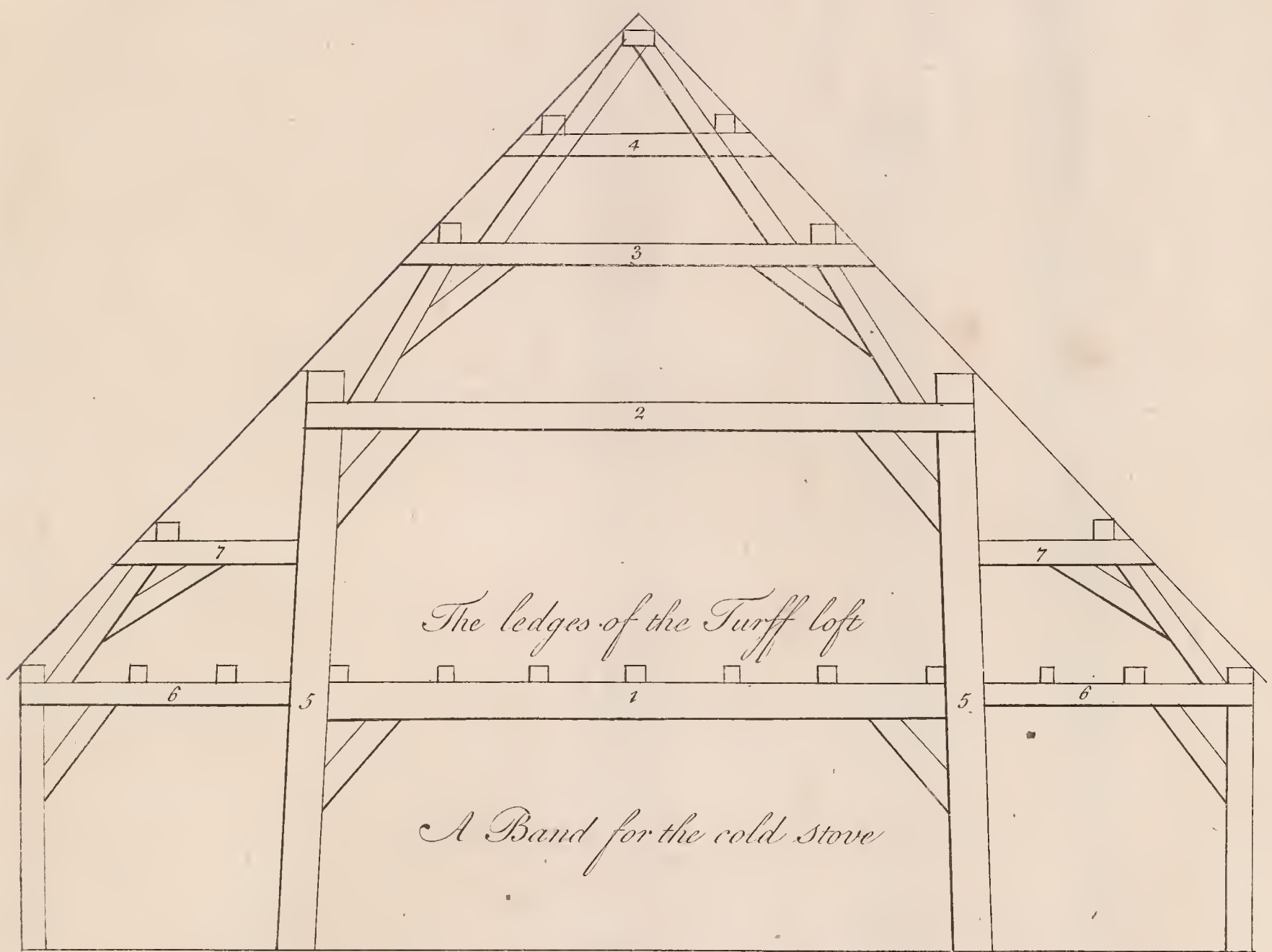
PLATE III.

A plan of the tower where the Madder is first laid to dry.

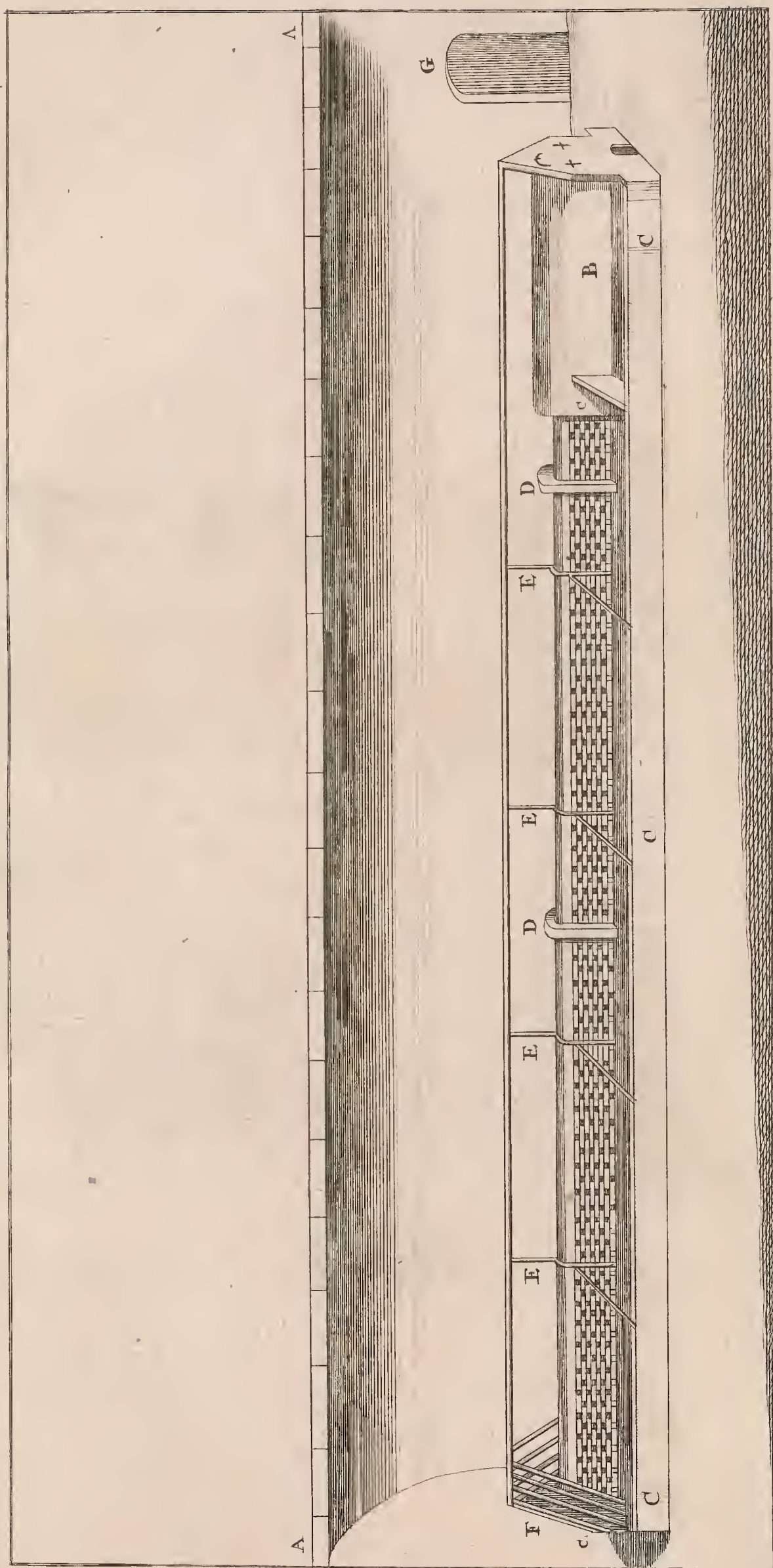
- A Is the oven of the tower.
- BB The pipes whereby the heat spreads itself, is here shewn by the openings where the tyles are taken off.
- C A sort of stairs by which they climb.
- DD The windlass with its rope and hook, to hoist the Madder to the lofts.

EEEE

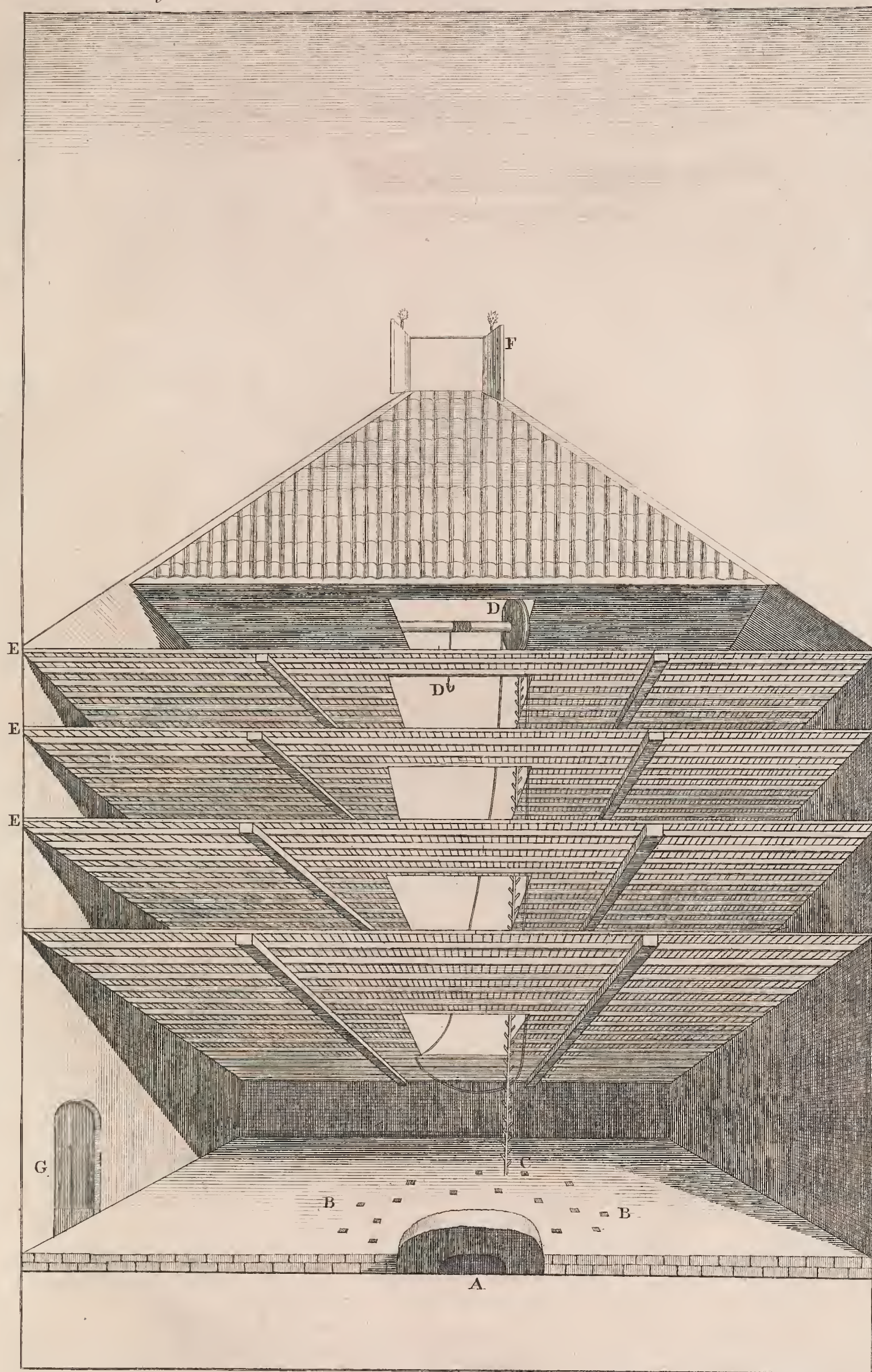
A Plan of the Structure of the Cold Stove



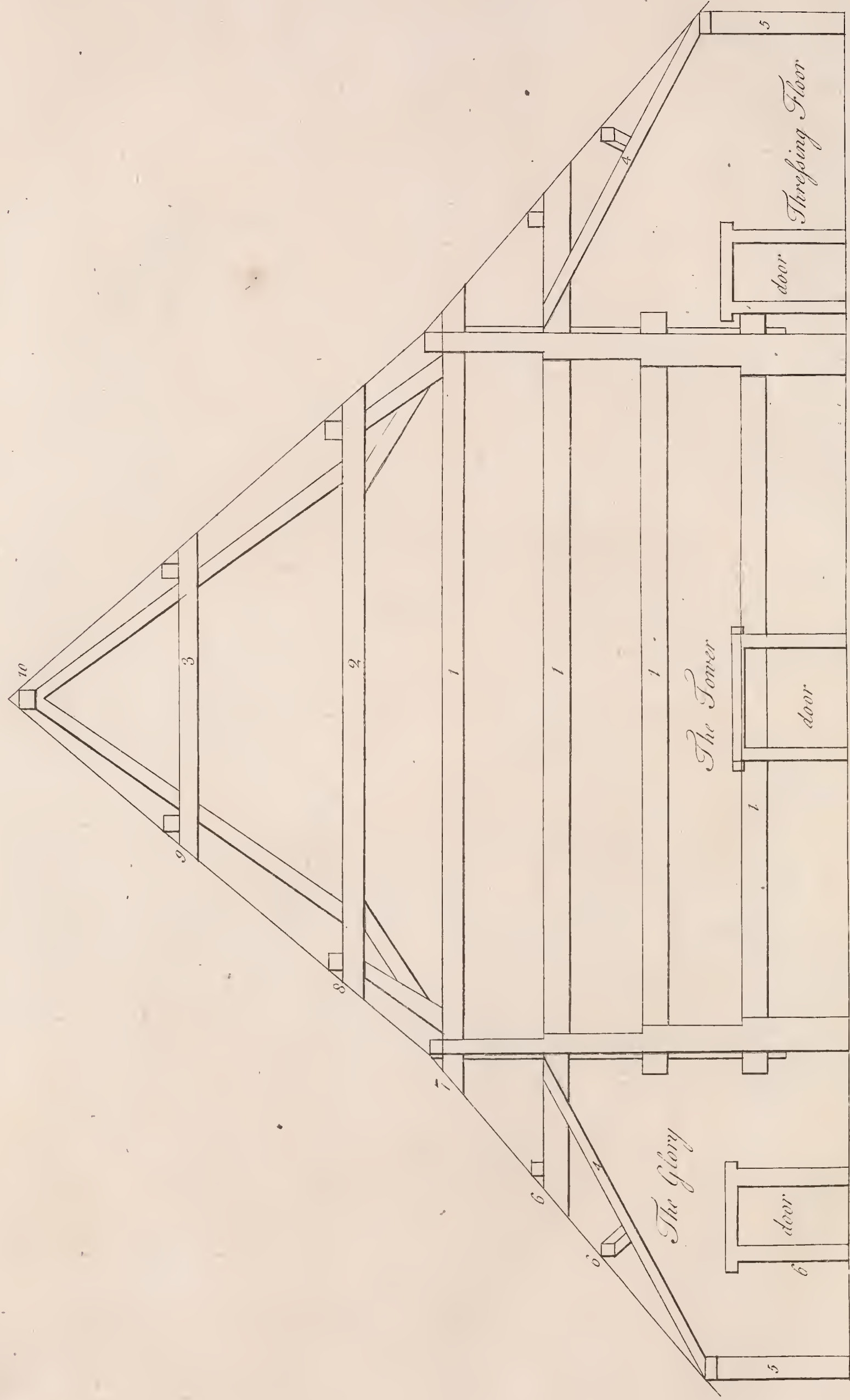
The Arched Room cut perpendicularly thro' the middle where the Kibn stands, with a representation of the Kibn.



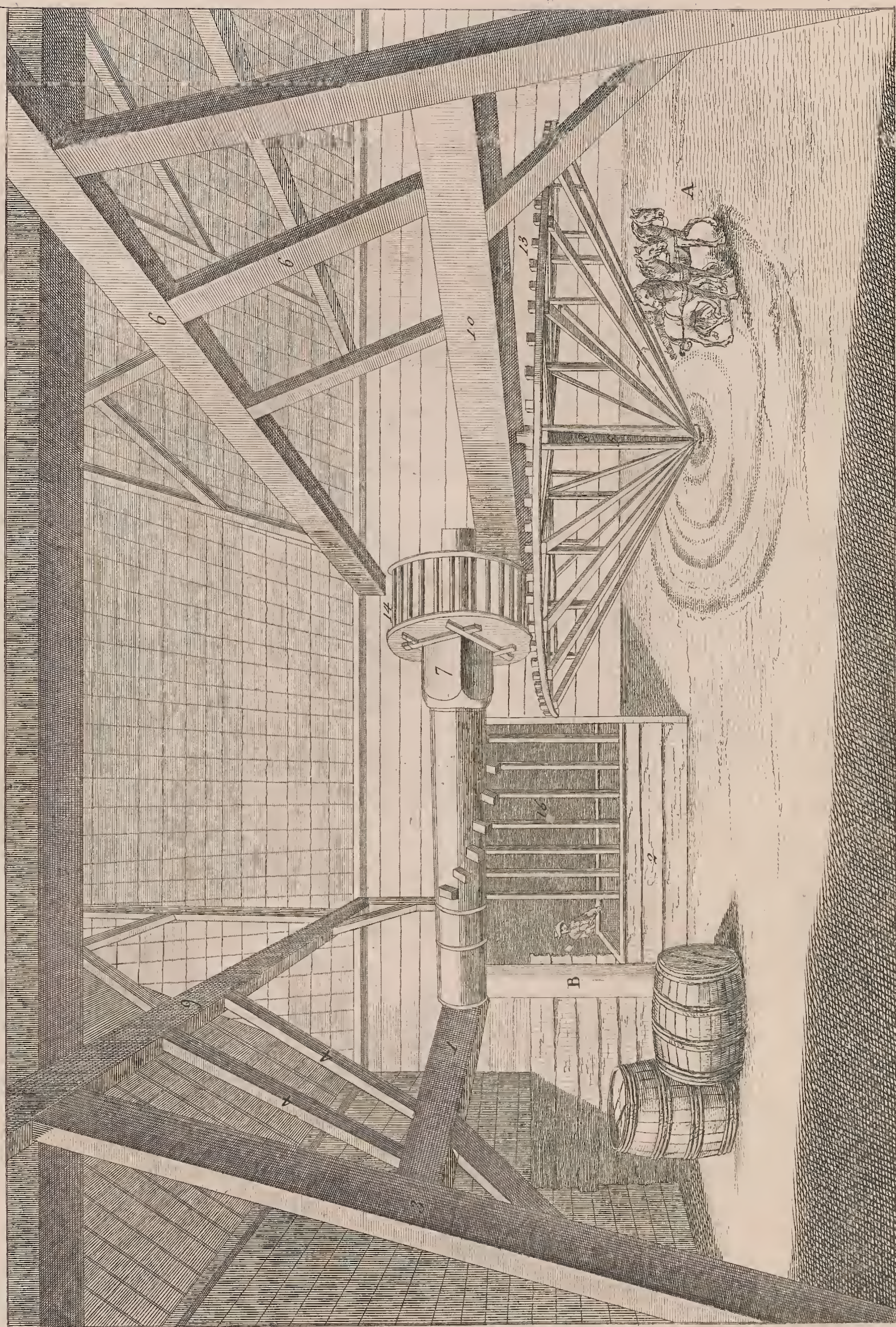
A Plan of the Tower where the Madder is first layed to dry.



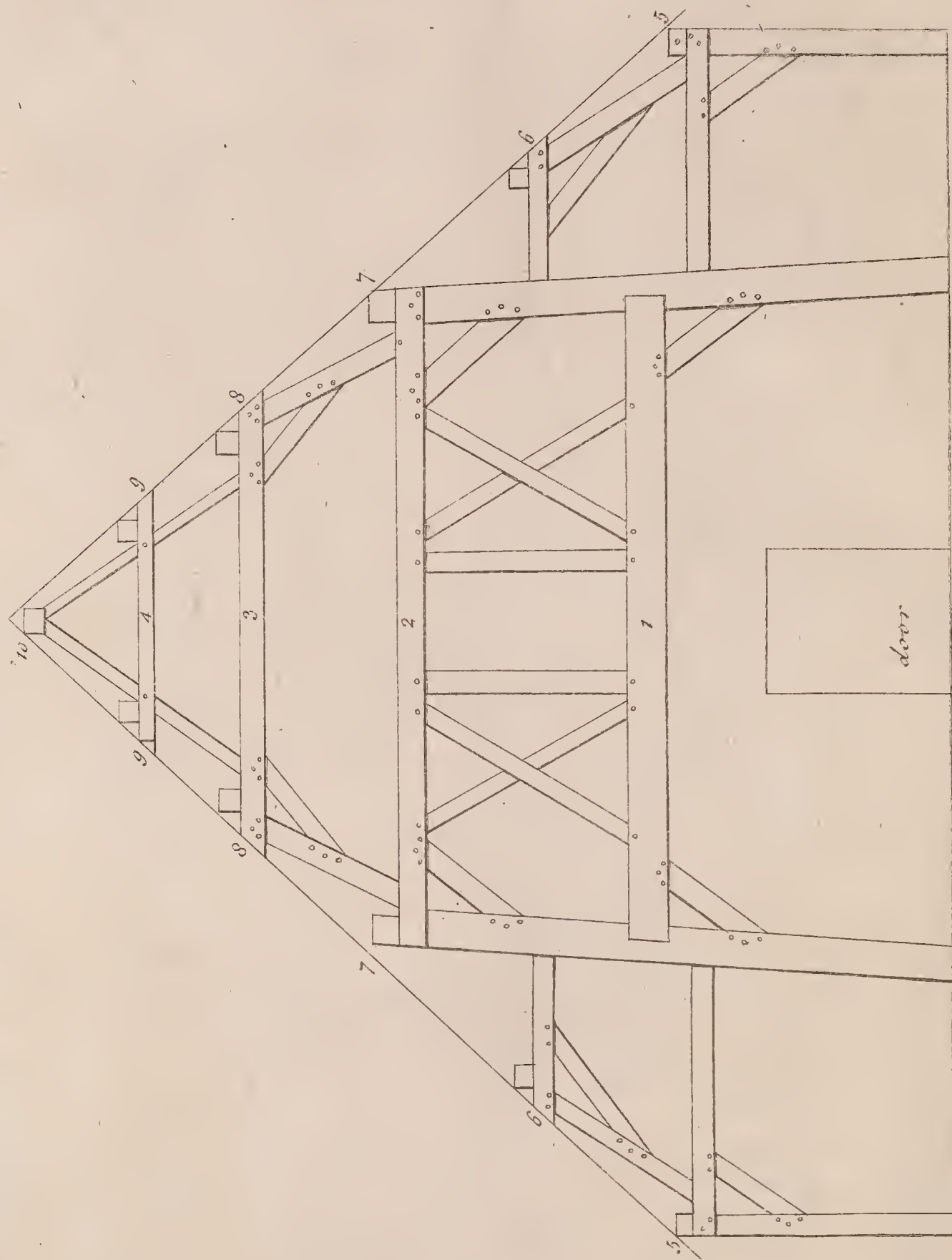
A Section of the Tower



A Plan of the Pounding House.



A Section of the Pounding House.



R U B

EEEE The four lofts of the lath of the oven.
F The chimney above the roof.
G The door by which they enter.

P L A T E IV.

An explanation of the plan of the section of the tower.

Fig. 1. 1. 1. 1. The four bands of the tower which are sixteen inches square.

2. The cap band, ten by twelve inches.
3. The springing band, six by eight inches.
4. The interstice to the tower, six by seven inches.
5. The spanning plate, five by seven inches.
6. The lower and second girder, six by seven inches.
7. The third girder, seven by nine inches.
8. The fourth girder, six by eight inches.
9. The fifth girder, six by seven inches.
10. The crown piece of the tower, five by six inches.

The ribs in the tower must be laid fourteen inches asunder from middle to middle, corner-ways, and the laths between an inch and a half distant.

P L A T E V.

A plan of the pounding-house, in which is shewn at A, the driver, who, with his three horses, causes the mill to turn, which works the stampers: At B is shewn the pounder, who, with his shovel, continually brings the Madder under the stampers.

Fig. 1. Is the beam which supports the axle-tree, which is fourteen by fifteen inches.

2. The hollow Oaken block or trough, twenty-seven by twenty-nine inches.
3. The king post, eighteen inches square.
4. The upper band, six by seven inches.
5. The cross bands, five by seven inches.
6. The cross arms, six by ten inches.
7. The swaarden, six by ten inches.
8. The axis, from six to eight inches.
9. The feller, six by eight inches of Elm wood.
10. The king beam, eleven by thirteen inches Fir wood.
11. The drawers under the mill, five by six inches.
12. The plate for the running of the truckle, three by sixteen inches.
13. The wooden knobs to the wheel of Ash.
14. The staves made of Box wood.
15. The six stampers, six inches square, of Ash.

P L A T E VI.

An explanation of the section of the pounding-house.

Fig. 1. The under band, sixteen inches square.

2. The upper band, twelve by fourteen inches.
3. The band of the cap post, ten by twelve inches.
4. The springing band, six by seven inches.
5. The spanning plate, five by seven inches.
6. The first girder, six by seven inches.
7. The second girder, nine by eleven inches.
8. The third girder, six by eight inches.
9. The uppermost girder, six by seven inches.
10. The top or cap, four by five inches.

The above account is the method of cultivating Mad-der in Zealand, where the best Madder is now pro-duced; to this I shall add, what I have observed of the growing of Madder in other parts of Holland, as also the experience I have had of the growth of Mad-der in England, with an account of the method of planting it here.

In the year 1727, I observed a great quantity of this plant cultivated in Holland, between Helvoetsluys and the Brill; and it being the first time I had ever seen any considerable parcel of it, I was tempted to

R U B

make some enquiries about its culture, and take some minutes of it down upon the spot, which I shall here insert, for the use of such as may have curiosity to at-tempt the culture of it.

In autumn they plough the land, where they intend to plant Madder in the spring, and lay it in high ridges, that the frost may mellow it; in March they plough it again, and at this season they work it very deep, laying it up in ridges eighteen inches asunder, and about a foot high; then about the beginning of April, when the Madder will begin to shoot out of the ground, they open the earth about their old roots, and take off all the side-shoots which extend them-selves horizontally, just under the surface of the ground, preserving as much root to them as possible; these they transplant immediately upon the tops of the new ridges, at about a foot apart, observing al-ways to do this when there are some showers, be-cause then the plants will take root in a few days, and will require no water.

When the plants are growing, they carefully keep the ground hoed, to prevent the weeds from coming up between them; for if they are smothered by weeds, especially when young, it will either destroy or weaken them so much, that they seldom do well after. In these ridges they let the plants remain two seasons, during which time they keep the ground very clean; and at Michaelmas, when the tops of the plants are decayed, they take up the roots and dry them for sale. This is what I could learn of their method of cultivating this plant, to which I will subjoin a few observations of my own, which I have since made upon the culture of Madder in England.

The land upon which I have found Madder thrive best, is a soft sandy loam, and if it has been in til-lage some years, it will be better than that which is fresh broken up. This should have at least a depth of two feet and a half, or three feet of good earth, and must be quite clear from Couch, or the roots of any bad weeds; for as the roots of Madder should remain three years in the ground, so where there are any of those weeds which spread and mul-tiply at their roots, they will intermix with the Mad-der roots, and in three years will have taken such pos-session of the ground, as to greatly weaken the Mad-der, and render it very troublesome to separate when the Madder is taken up.

The ground should be ploughed deep before winter, and laid in ridges to mellow; and if it is not too strong, there will be no necessity for ploughing it again, till just before the time of planting the Mad-der, when the land should be ploughed as deep as the beam of the plough will admit; and there should be men following the plough in the furrows, which should dig a full spit below the furrow, and turn it up on the top; by preparing the ground of this depth, the roots of the Madder will strike down, and be of greater length, in which the goodness of the crop chiefly consists. The land being thus prepared and made level, will be fit to receive the plants. The best time for planting of the Madder is about the mid-dle or the latter end of April, according as the sea-son is more or less forward, which must be deter-mined by the young shoots; for when these are about two inches above ground, they are in the best state for planting.

In the taking up of these shoots for planting, the ground should be opened with a spade, that they may be separated from the mother plants with as much root as possible; for if the roots are broken off, they will not succeed: these plants should be drawn up no faster than they are planted; for if they lie long above ground, they will shrink and their tops will wither, and then they often miscarry; therefore if they are brought from a distant place, there should be great care taken in the packing of them up for carriage; especial regard should be had not to pack them so close, or in so great quantity, as to cause them to heat, for that will soon spoil them; but if they are a little withered

withered by lying out of the ground, their roots should be set upright in water for a few hours, which will stiffen and recover them again.

In the planting of Madder, there are some who make the rows but one foot asunder, others one foot and a half, some two feet, and others who allow them three feet distance; I have made trial of the three last distances, and have found when the roots have been left three years in the ground, that three feet distance row from row is the best; but if it is taken up in two years, two feet asunder may do very well; and the distance in the rows, plant from plant, should be one foot, or a foot and a half.

If there is no danger of the ground being too wet in winter, the plants may be planted on the level ground; but if on the contrary, the ground should be raised in ridges where each row of plants is to be set, that their roots may not reach the water in winter, for if they do, it will stop their downright growth; and this is the reason why the Dutch, who plant Madder in the Low Countries, raise their ridges so high as two or three feet; and in Zealand, where the ground is drier, they raise the beds four or five inches above the intervals, that the wet may drain off from the beds where the Madder is planted.

The method of planting is as follows: viz. the ground being made smooth, a line is drawn across it to mark out the rows, that they may be strait, for the more convenient cleaning, and for the better digging or ploughing of the ground between the rows; then with an iron-shod dibble, holes are made, at the distance which the plants are to stand from each other. The depth of the holes must be in proportion to the length of the roots of the plants, which must be planted the same depth they had been while they were upon the mother plants; for if any part of the root is left above ground, the sun and winds will dry them, which will retard the growth of the plants; and should any part of the green be buried in the ground, it will not be so well; though of the two, the latter will be less prejudicial, especially if there is not too much of the green buried. When the plants are put into the holes, the earth should be pressed close to them to secure them from being drawn out of the ground, for crows and rooks frequently draw the new plants out of the ground before they get new roots, where there is not this care taken: so that in two or three days, I have known half the plants on a large piece of land destroyed by these birds.

If there happens to be some showers of rain fall in a day or two after the plants are planted, it will be of great service to them, for they will presently put out new roots, and become strong; so that if dry weather should afterward happen, they will not be in so much danger of suffering thereby, as those which are later planted. There are some who, from a covetous temper of making most use of the ground, plant a row of Dwarf Peas or Kidney Beans between each row of Madder, and pretend that thereby the land is kept cleaner from weeds; but I am very certain the crop of Madder is injured thereby much more than the value of those things which grow between the rows, as I have experienced; therefore I advise those persons who plant Madder, never to sow or plant any thing between the rows, but to keep the Madder quite clean from weeds, or any other kind of vegetable.

In order to keep the ground thus clean, it should be scuffled over with a Dutch hoe, as soon as the young weeds appear. When a man can perform a great deal of this work in a day, and if it is done in dry weather, the weeds will die as fast as they are cut down; whereas, when the weeds are left to grow in the spring, so as to get strength, they are not so soon destroyed, and the expence of hoeing the ground then will be more than double; besides, there will be danger of cutting down some of the weaker plants with the weeds, if the persons employed to perform this work are not very careful; therefore it is much cheaper, as also better for the Madder, to begin this

work early in the spring, and to repeat it as often as the weeds render it necessary; for by keeping the ground thus constantly clean, the Madder will thrive the better.

During the first summer, the only culture which the Madder requires, is that of keeping it clean in the manner before directed; and when the shoots or haulm of the plants decay in autumn, it should be raked off the ground; then the intervals between the rows should be either dug with a spade or ploughed with a hoeing plough, laying up the earth over the heads of the plants in a roundish ridge, which will be of great service to the roots. The Dutch cover the haulm of their Madder with earth, leaving it to rot upon the ground; this perhaps may be necessary in their country, to keep the frost out of the ground; but as I have never found that the severest winters in England have injured the Madder roots, there is not the same necessity for that practice here.

The following spring, before the Madder begins to shoot, the ground should be hoed and raked over smooth, that the young shoots may have no obstruction; and if there should be any young weeds appearing on the ground, it should be first scuffled over to destroy the weeds, and then raked over smooth; after this, the same care must be taken in the following summer to keep the ground clean; and if it is performed by the hoe plough, the earth of the intervals should be thrown up against the side of the ridges, which will earth up the roots, and greatly increase their strength; but before the ground of one interval is so hoed, the haulm of the plants should be turned over to the next adjoining interval; and if they are permitted so to lie for a fortnight or three weeks, and then turned back again on those intervals which were hoed, observing first to scuffle the ground to destroy any young weeds which may have appeared since the stirring of the ground; then the alternate intervals should be ploughed in like manner, turning the earth up against the opposite sides of the roots; by this method the intervals will be alternately ploughed, and the plants earthed up, whereby the ground will be kept clean, and stirred, which will greatly promote the growth of the roots; and by this method the superficial shoots will be subdued, and the principal roots greatly strengthened. The following autumn the ground should be cleared of the haulm and weeds, and the earth raised in ridges over the roots, as in the foregoing year.

The third spring the roots will furnish a great supply of young plants; but before these appear, the ground should be cleaned and raked smooth, that the shoots may have no obstruction to their coming up; and when the young plants are fit to take off, it should be performed with care, always taking off those which are produced at the greatest distance from the crown of the other plants, because those are what rob them most of their nourishment, and the wounds made by separating them from the old roots are not near so hurtful as those near the crown; for the stripping off too many of the shoots there, will retard the growth of the plants.

The culture of the Madder in the third summer must be the same as the second; but as the roots will then be much stronger, the earth should be laid up a little higher to them at the times when the ground is cleaned; and if all the distant superficial shoots, which come up in the intervals are hoed or ploughed off, it will be of service to strengthen the larger downright root; and as the haulm will now be very strong and thick, the frequent turning it over from one interval to another will prevent its rotting; for if it lies long in the same position, the shoots which are near the ground, where there will be always more or less damp, and being covered with the upper shoots, the air will be excluded from them, which will cause them to rot, for the shoots of Madder are naturally disposed to climb up any neighbouring support; and in places where they have been supported, I have seen them more than ten feet high; but the expence of staking the

the plants to support their shoots would be much too great to be practised in general; therefore the other method of turning the haulm over from one interval to the other will be found of great use, for hereby it is kept from decaying, and by so doing the sun is alternately admitted to each side of the roots, which is of more consequence to the growth of the Madder than most people conceive; and from many repeated trials I have found, that where the haulm has decayed or rotted in summer, it has greatly retarded the growth of the roots. There have been some ignorant pretenders who have advised the cutting off the haulm in summer, in order to strengthen the roots; but whoever practises this, will find to their cost the absurdity of this method; for I have fully tried this many years ago, and have always found that every other root, upon which this was practised, was at least a third part smaller than the intermediate roots, whose haulm was left entire. The first occasion of my making this experiment was, because the plants had been set too near each other, and the season proving moist had increased the number and strength of the shoots, so that they were so thick, as that many of them began to rot; to prevent which, I cut off the shoots of every other plant to give room for spreading the others thinner, but soon after this was done, the plants produced a greater number of shoots than before, but they were weaker, and the effect it had upon the roots was as before related; since which time I have frequently repeated the experiment on a few roots, and have always found the effect the same.

As soon as the haulm of the Madder begins to decay in autumn, the roots may be taken up for use, because then the roots have done growing for that season, and will then be plumper and less liable to shrink than if they are dug up at another season; for I have always found, that roots of every kind of plant, which are taken out of the ground during the time of their growing, are very apt to shrink, and lose more than half their weight in a short time; whereas, when they are taken up soon after their leaves decay, they will not soon after shrink much.

When the season for digging up the Madder root is come, it should be done in the following manner, viz. a deep trench should be dug out at one side of the ground next to the first row of Madder to make a sufficient opening to receive the earth, which must be laid therein in digging up the row of roots, so that it should be at least two feet broad, and two spits and two shovellings deep, and should be made as close as possible to the roots, being careful not to break or cut the roots in doing it; then the row of roots must be carefully dug up, turning the earth into the trench before-mentioned. In the doing of this there should be to every person who digs, two or three persons to take out the roots, that none may be lost, and as much of the earth should be shaken out of the roots as possible; and after the principal roots are taken up, there will be many of the long fibres remaining below; therefore, in order to get the roots as clean as possible, the whole spot of ground should be dug of the same depth as the first trench, and the pickers must follow the diggers to get them all out to the bottom. As the digging of the land to this depth is necessary, in order to take up the roots with as little loss as possible, it is a fine preparation for any succeeding crop; and I have always found that the ground where Madder has grown, produced better crops of all kinds than land of equal goodness, which had not the like culture.

After the roots are taken up, the sooner they are carried to the place of drying, the finer will be their colour; for if they lie in heaps, they are apt to heat, which will discolour them; or if rain should happen to wet them much, it will have the same effect, therefore no more roots should be taken up than can be carried under shelter the same day.

The first place, in which the roots should be laid to dry, must be open on the sides to admit the air, but covered on the top to keep out the wet. If a build-

ing is to be erected new, such as the tanners have for drying their skins will be as proper as any, for these have weather-boards from top to bottom at equal distances to keep out the driving rain, but the spaces between being open admit the air freely; and if, instead of plank floors or stages above each other, they are laid with hurdles or basket-work, upon which the roots are laid to dry, the air will have freer passage to the under side of the roots, which will dry them more equally.

In this place they may remain four or five days, by which time the earth which adhered to the roots will be so dry as to easily rub off, which should be done before the roots are removed to the cold stove, for the slower the roots are dried, the less they will shrink, and the better will be the colour of the Madder; and the cleaner the roots are from earth, the better the commodity will be for use when prepared.

After the roots have laid a sufficient time in this place, they should be removed into another building called the old stove, in which there should be conveniences of flues passing through different parts of the floor and the side-walls; in this the roots should be laid thin upon the floors, and turned from time to time as they dry, taking those roots away, which are nearest to the flues which convey the greatest heat, placing them in a cooler part of the room, and removing such of them as had been in that situation to the warmer, from whence the other are taken. The constant care in this particular will be of great service to the quality of the Madder; for when this is properly conducted, the roots will be more equally dried, and the commodity, when manufactured, will be much fairer and better for use.

When the outside of the roots have been sufficiently dried in this cold stove, they should be removed to the threshing floor, which may be the same as in a common barn where Corn is threshed. The floor of this should be swept, and made as clean as possible; then the roots should be threshed to beat off their skins or outside coverings; this is the part which is prepared separately from the inner part of the root, and is called mull, which is sold at a very low price, being the worst sort of Madder, so cannot be used where the permanency or beauty of the colours are regarded; these husks are separated from the roots, and pounded by themselves, which are afterward packed up in separate casks, and sold by the title of mull. If this is well prepared, and not mixed with dirt, it may be sold for about fifteen shillings per hundred weight, at the price which Madder now bears; and this, as is supposed, will defray the whole expence of drying the crop.

After the mull is separated from the roots, they must be removed to the warmer stove, where they must be dried with care; for if the heat is too great, the roots will dry too fast, whereby they will lose much in weight, and the colour of the Madder will not be near so bright; to avoid which, the roots should be frequently turned, while they remain in this stove, and the fires must be properly regulated. If some trials are made by fixing a good thermometer in the room, the necessary heat may be better ascertained than can be done any other way; but this will require to be greater at some times than at others, according as the roots are more or less succulent, or the weather more or less cold or damp; but it will always be better to have the heat rather less than over hot; for, though the roots may require a longer time to dry with a slow heat, yet the colour will be better.

When the roots are properly dried in this stove, they must be carried to the pounding-house, where they must be reduced to powder in the manner before related; but whether it is necessary to separate the krops from the gemeens, as is now practised by the Dutch, the consumers of Madder will be better judges than myself.

There has been some objections of late mentioned to the introducing, or rather retrieving the culture of Madder in England, which it may be proper here to

take notice of, lest they should have so much weight as to prevent many persons from engaging in it. The first which has been generally started is, that the land in this country is not so well adapted for growing Madder as that in Holland: to which I can with truth affirm, that there are vast tracts of land here much better adapted for producing Madder than the best land in Zealand; and from the experience which I have had of its growth, will produce a greater crop. Another objection which I have heard, was the labour in Holland being cheaper than in England. The Dutch will always undersell us, so consequently will maintain this branch of trade; but this is certainly a great mistake: for though the labourers employed in cultivating Madder may not earn so great wages as is generally paid in England, sure I am, that the difference between an expert English labourer and that of the best Dutchman, in the ploughing, hoeing, planting, &c. of Madder, is much greater than that of their pay; for I am sure a good English gardener or ploughman will do more business, and perform it better, in four days, than the best workman in Holland can do in six. What I now say is greatly within compass, from my own knowledge; so that, supposing we were to proceed in the same manner now practised by the Dutch, this could be no objection to the cultivating of Madder; but we shall soon find ways of performing the most laborious part, at much less expence, by means of the hoeing plough, which may be used to great advantage in the cultivation of Madder, whereby the expence will be much lessened; and, when once this is well established in England, there can be no doubt but that great improvements will be made both in the culture and method of preparing the commodity for use.

There has been objections made against farther trials of growing Madder, because some who have engaged in it have not succeeded: but in answer to this, it must be observed, that their ill success was owing to a want of skill. Some of them continued to plant repeated crops of Madder on the same spot of ground, till the roots became so small, as scarce to pay the expence of digging up; and here it is proper to observe, that Madder should not be planted on the same land, till after an interval of seven or eight years; during which interval the ground may be sown with any sort of grain, or kitchen vegetables, which it will produce to great advantage after Madder, because the land will be wrought so deep. The Dutch always sow grain upon their Madder ground in the intervals of four years, and have great crops from it; and they are obliged, from the scarcity of land fit for this purpose, to plant the same ground after an interval of four years; but, as we are not under the same necessity, it will be much better to stay eight years, for the roots of Madder are very similar to those of Asparagus, and draw much the same nourishment from the ground; and it is well known that, when Asparagus roots are dug up, which have been growing three years, if the same is planted with Asparagus again in a few years, it will not thrive equal to that which is planted on ground upon which Asparagus has not grown for several years; and this is always found to be the case even in kitchen-gardens near London, where, by the well working and frequent dunging the ground, it may be supposed changed in three or four years, more than the fields can possibly be in eight or ten.

Madder should not be planted in very rich dunged land, for in such there will be very large haulm, but the roots will not be in proportion; and, where there is much dung or sea-coal ashes, the Madder roots will be of a darker colour, as it will also where it is cultivated in the smoke of London, which is likewise the case with Liquorice; for that which grows in a sandy loam at a distance from London, is always much brighter and clearer than that which grows in the rich lands in the neighbourhood of London.

In Zealand the Madder is principally cultivated by

the kitchen-gardeners, who, in the change of their crops, do every fourth or fifth year plant the Madder upon the same ground again, in like manner as the gardeners in the neighbourhood of London plant Asparagus for forcing in winter upon hot-beds. And as they have public kilns in Holland for drying of the Madder roots, so they know the expence of manufacturing the commodity for sale, which renders the cultivation sure and easy to them.

If the cultivation of Madder is carried on properly in England, it will employ a great number of hands from the time harvest is over, till the spring of the year, which is generally a dead time for labourers, and hereby the parishes may be eased of the poor's rate, which is a consideration worthy of public attention.

RUBUS. Tourn. Inst. R. H. 614. tab. 385. Lin. Gen. Plant. 557. [This plant is so called, of the red colour of the fruit before it comes to maturity.] The Bramble or Raspberry-bush; in French, *Ronce*.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, which is cut into five spear-shaped segments; it hath five roundish petals, and a great number of stamina which are inserted in the empalement, and are shorter than the petals, terminated by roundish compressed summits, with a great number of germen, having small hair-like styles on the side of the germen, crowned by a single permanent stigma. The germen afterward becomes a berry composed of many acini collected into a head, each having one cell, in which is contained one oblong seed.

This genus of plants is ranged in the fifth section of Linnæus's twelfth class, which contains those plants whose flowers have many stamina which are inserted in the empalement, and many styles.

The SPECIES are,

1. RUBUS (*Fruticosus*) foliis quinato-digitatis ternatisque, caule petiolisque aculeatis. Flor. Suec. 409. *Bramble or Blackberry with hand-shaped leaves, having five and three lobes, and the foot-stalk and branches prickly.* Rubus vulgaris five Rubus fructu nigro. C. B. P. 479. *The common Blackberry.*
2. RUBUS (*Cæsius*) foliis ternatis subnudis lateralibus bilobis caule aculeato. Hort. Cliff. 192. *Bramble with naked trifoliate leaves and a prickly stalk.* Rubus repens fructu cæcio. C. B. P. 479. *The Dewberry.*
3. RUBUS (*Idæus*) foliis quinato-pinnatis ternatisque, caule aculeato, petiolis canaliculatis. Flor. Suec. 408. *Bramble with winged leaves, having five and three lobes, a prickly stalk, and channelled foot-stalks.* Rubus Idæus spinosis. C. B. P. 479. *Prickly Raspberry.*
4. RUBUS (*Glabro*) foliis ternatis subtus tomentosis, caule glabro. *Raspberry with trifoliate leaves, which are woolly on their under side, and have a smooth stalk.* Rubus Idæus lævis. C. B. P. 479. *The smooth Raspberry.*
5. RUBUS (*Occidentalis*) foliis quinato-pinnatis ternatisque, caule aculeato, petiolis teretibus. Lin. Sp. Plant. 493. *Bramble with winged leaves having five and three lobes, a prickly stalk, and taper foot-stalks.* Rubus Idæus fructu nigro, Virginianus. Hort. Elth. 327. *Virginia Raspberry with a black fruit.*
6. RUBUS (*Odoratus*) foliis simplicibus palmatis, caule inermi multifolio multifloro. Hort. Cliff. 192. *Raspberry with single hand-shaped leaves, and an unarmed stalk having many leaves and flowers.* Rubus odoratus. Cornut. 153. *Sweet Canada Raspberry, commonly called flowering Raspberry.*
7. RUBUS (*Hispidus*) foliis ternatis nudis, caulibus petiolisque hispidis. Lin. Sp. Plant. 493. *Bramble with naked leaves growing by threes, and hairy stalks and foot-stalks.*
8. RUBUS (*Saxatillus*) foliis ternatis nudis, flagellis repentibus herbaceis. Flor. Suec. 411. *Bramble with naked trifoliate leaves, and creeping herbaceous stalks.* Chamærubus saxatillus. C. B. P. 110. *Dwarf Rock Bramble.*
9. RUBUS (*Arcticus*) foliis ternatis, caule inermi unifloro. Flor. Suec. 412. *Bramble with trifoliate leaves, and an unarmed stalk having one flower.* Rubus humilis,

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lis, flore purpureo. Buxb. Cent. p. 13. *Dwarf Bramble with a purple flower.*

10. RUBUS (*Chamæmorus*) foliis simplicibus lobatis, caule unifloro. Flor. Suec. 413. *Bramble with single leaves having lobes, and a stalk bearing one flower.* Chamæmorus. Clus. Hist. 118. *The Dwarf Mulberry, or Cloudberry.*

11. RUBUS (*Dalibarda*) foliis simplicibus cordatis indivisis crenatis, scapo aphylo unifloro. Lin. Sp. Plant. 708. *Bramble with single, heart-shaped, undivided leaves, and one flower on each stalk.*

The first sort grows naturally on the side of banks, and in hedges, in most parts of England, so is not cultivated in gardens; this is so well known as to need no description. Of this there are the following varieties:

1. The common Bramble with white fruit, which was found in a hedge near Oxford by Mr. Jacob Bobart. The branches of this sort are covered with a light green bark; the leaves are of a brighter green than the common sort, and the fruit is white, but it seldom produces fruit in gardens.

2. The Bramble without thorns; this is in every respect like the first, but the branches and foot-stalks have no thorns.

3. The Bramble with the legant cut leaves; this differs from the first in the leaves, being finely cut.

4. The Bramble with double flowers; this differs from the first in having very double flowers, so is frequently planted in gardens for ornament.

5. The Bramble with variegated leaves. This is by some preserved in gardens, but is very apt to become plain, if planted in good ground.

These sorts are easily propagated by laying down their branches, which will put out roots at every joint very freely. They may be transplanted any time from September to March, and will grow in almost any soil or situation.

The second sort hath weaker trailing stalks than the first; the leaves are trifoliate, and the lobes are larger than those of the other; the fruit is smaller, the acini larger, and but few in each fruit, which are of a deeper black colour. This grows naturally in England, and is known by the title of Dewberry.

The third sort is the Raspberry, which grows naturally in the woods in the northern parts of England, but is cultivated in gardens for its fruit, which supplies the table at the season when they are ripe. There are two or three varieties of this, one with a red, and the other with a white fruit, and the third generally produces two crops of fruit annually; the first ripens in July, and the second in October, but those of the latter season have seldom much flavour. These are accidental varieties, but the fourth sort I believe to be a distinct species, for the leaves are trifoliate, larger than those of the common sort, woolly on their under side, and the branches and stalks have no thorns. This produces but few fruit, and those are small, which has occasioned its being neglected.

The Raspberry is generally propagated by suckers, though I should prefer such plants as are raised by layers, because they will be better rooted, and not so liable to send out suckers as the other, which generally produce such quantities of suckers from their roots, as to fill the ground in a year or two; and where they are not carefully taken off or thinned, will cause the fruit to be small, and in less quantities; especially when the plants are placed near each other, which is too often the case, for there are few persons who allow these plants sufficient room.

In preparing these plants, their fibres should be shortened; but the buds which are placed at a small distance from the stem of the plant, must not be cut off, because those produce the new shoots the following summer. These plants should be planted about two feet asunder in the rows, and four or five feet distance row from row; for if they are planted too close, their fruit is never so fair, nor will ripen so kindly, as when

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they have room for the air to pass between the rows. The soil in which they thrive best, is a fresh strong loam, for in warm light ground they do not produce so great plenty of fruit, for they naturally grow in cold land and in shade; therefore when they are planted in a warm situation and a light soil, they do not succeed.

The season for dressing them is in October, at which time all the old wood that produced fruit the preceding summer, should be cut down below the surface of the ground, and the young shoots of the same year must be shortened to about two feet in length; then the spaces between the rows should be well dug, to encourage their roots; if you bury a very little rotten dung therein, it will make them shoot vigorously the summer following, and their fruit will be much fairer. During the summer season they should be kept clean from weeds, which, with the before-mentioned culture, is all the management they will require; but it is proper to make new plantations once in three or four years, because when the plants are suffered to remain long, they will produce few and small fruit.

The Virginian flowering Raspberry, is commonly propagated in the nurseries as a flowering shrub. The flowers of this sort are as large as small Roses, and there is a succession of them for two months or more, so that they make an agreeable variety during their continuance. This sort frequently produces fruit in England, which are not so large as those of the common sort, and have little flavour. These ripen in September or the beginning of October.

The Virginian Raspberry rises with purplish stalks a little higher than the common sort; the leaves are of a lucid green on their upper side, but hoary on their under; their foot-stalks are taper; the fruit is shaped like those of the common Blackberry, and are of a deep black when ripe; the fruit has little flavour, so the plants are never cultivated for their fruit here. It ripens late in autumn.

The eighth sort grows naturally upon rocky hills in the northern counties of England, and most of the northern parts of Europe. This hath trailing herbaceous stalks, which put out roots at their joints, whereby it propagates in plenty; the leaves are trifoliate, the lobes are large, and of a lucid green; the fruit are small, so not worth cultivating.

The ninth sort grows naturally in Norway, Sweden, and Siberia; this hath an upright stalk about three inches high, garnished with small trifoliate leaves; the stalk is terminated by one purple flower, which is succeeded by a small red fruit, having the scent and flavour of Strawberries. This plant grows naturally upon mossy bogs, so cannot be cultivated to any purpose on dry ground, and is preserved in a few gardens for the sake of variety.

The tenth sort grows naturally upon some of the highest hills in the north of England and Scotland, also upon high boggy places in the northern parts of Europe. This plant cannot be transplanted into gardens so as to thrive; the stalks rise about six or eight inches high, and are generally garnished with two lobated leaves, standing at a distance from each other. The stalk is terminated by a single flower, which is succeeded by a small black fruit, not much unlike that of the Dewberry, and is by some persons much esteemed; the red and black game feed much upon it in the season.

The eleventh sort grows naturally in Canada; it has a creeping herbaceous root, sending out trailing herbaceous stalks, which frequently put out roots; the leaves are for the most part composed of three heart-shaped lobes, which are veined and hairy; the flowers have five white petals: the flowers are male and female on the same plant, and the fruit is somewhat like the last.

RUDBECKIA. Lin. Gen. Plant. 878. Obeliscotheca. Vaill. Act. Par. 1720. Bobartia. Pet. Mus. Dwarf Sunflower, vulgò.

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The CHARACTERS are,

It hath female and hermaphrodite florets inclosed in one common empalement, composed of two orders of leaves, the scales of which are plain, broad, and short. The rays or border of the flower is composed of female half florets, which are stretched out on one side like a tongue, and end with two or three indentures; these have germs sitting upon proper receptacles, but have neither style or stamina, and are barren. The hermaphrodite florets are tubulous, funnel-shaped, and indented in five parts at the brim. They have five short hair-like stamina in each, terminated by cylindrical summits, and a germ sitting in the common empalement, having a slender style crowned by a reflexed stigma, divided into two parts. The germs afterward become single, oblong, four-cornered seeds, crowned by their proper cup, which has four indentures.

This genus of plants is ranged in the third section of Linnæus's nineteenth class, which includes the plants whose flowers are composed of hermaphrodite fruitful florets, and female barren half florets.

The SPECIES are,

1. RUDBECKIA (*Hirta*) foliis indivisis spatulato-ovatis, radii petalis emarginatis. Lin. Sp. Plant. 907. *Rudbeckia* with oval, spattle-shaped, undivided leaves, and the petals of the rays indented. *Chrysanthemum heleenii* folio, umbone floris, grandiuscula prominente. Pluk. Alm. 99. tab. 242. *Corn Marygold* with an *Elecampane* leaf, and a large prominent middle to the flower, commonly called *Dwarf American Sunflower*.
2. RUDBECKIA (*Purpurea*) foliis lanceolato-ovatis alternis indivisis, petalis radii bifidis. Flor. Virg. 104. *Rudbeckia* with oval, spear-shaped, undivided leaves, placed alternate, and the petals of the ray bifid. *Chrysanthemum Americanum*, *doronici* folio, flore perfici coloris, umbone magno prominente ex atro purpureo viridi & aureo fulgente. Pluk. Alm. 99. *American Corn Marygold* with a *Leopardbane* leaf, a *Peach-coloured* flower, and a large prominent middle of a dark purple, green, and shining gold colour, commonly called *Dwarf Carolina Sunflower*.
3. RUDBECKIA (*Triloba*) foliis spatulatis, caulinis quibusdam trilobis, ramis indivisis. Hort. Upsal. 269. *Rudbeckia* with under leaves spattle-shaped, and the upper ones with three lobes. *Chrysanthemum cannabinum Virginianum* hirsutum, disco magno, petalis aureis radiato. Pluk. Alm. 100. tab. 22. fig. 2. *Virginian Hemp Agrimony*, with a large disk to the flower, and the petals of the rays of a gold colour.
4. RUDBECKIA (*Laciniata*) foliis inferioribus compositis acutè dentatis, caulinis simplicibus integris dentatisque. *Rudbeckia* with compound, indented, lower leaves, those upon the stalks single, entire, and indented. *Corona folis foliis amplioribus laciniatis*. Tourn. Inst. R. H. 490. *Sunflower* with large jagged leaves.
5. RUDBECKIA (*Quinata*) foliis omnibus quinatis, acutè dentatis exterioribus trilobatis. *Rudbeckia* with all the leaves composed of five lobes which are sharply indented, and the outer ones divided into three. *Corona folis foliis angustioribus laciniatis*. Tourn. Inst. R. H. 490. *Sunflower* with narrow jagged leaves.
6. RUDBECKIA (*Digitatis*) foliis inferioribus compositis, caulinis quinatis ternatisque, summis simplicibus. *Rudbeckia* with compound lower leaves, those on the stalks quinquelfoliate and trifoliate, and the top ones single. *Obeliscotheca* petalis florum perangustis longis, foliis digitatis, caule glabro ferrugineo. Amman. *Sunflower* with long narrow petals to the flower, hand-shaped leaves, and a smooth iron-coloured stalk.
7. RUDBECKIA (*Angustifolia*) foliis oppositis integerimis. Gron. Virg. 181. *Rudbeckia* with linear entire leaves placed opposite.

The first sort grows naturally in Virginia, and several other parts of North America. The root of this will continue four or five years, but unless there is care taken to shelter it in winter, the plants are sometimes destroyed by cold or too much wet. This sort sends out heads by which it may be propagated; the leaves are oblong, oval, and hairy; the stalks rise a foot and a half high, and have one or two leaves near the

bottom. The foot-stalk which supports the flower, is naked near a foot in length, and is terminated by one pretty large yellow flower, shaped somewhat like the Sunflower, from whence it was titled Dwarf Sunflower. The petals or rays of the flower are very stiff, and are slightly indented at their points; the middle or disk of the flower is very prominent, pyramidal, and of a dark purple colour. These flowers are of long duration; I have frequently observed one flower has continued in beauty near six weeks, and as the plants produce many flowers, so there is a succession of them on the same plant, from the middle of July till the frost puts a stop to them, which renders them more valuable. This sort will sometimes produce good seeds in England, when the seasons are very favourable; but they are generally propagated here by offsets or slips, unless when good seeds can be procured from America. The best time to separate the offsets is in the spring, because the plants continue to flower so late in autumn, as to render it impracticable to perform it till the spring, so that the slips will flower but weak the same year. The plants will live abroad in the open air through the winter, if they are planted in a dry soil and a warm situation; but it will always be prudent to shelter two or three plants under a common hot-bed frame in winter to preserve the kind, because in very severe winters they are often killed.

The second sort grows naturally in Carolina, and also in Virginia. This is a perennial plant like the former, but very rarely produces seeds in England; nor do the plants put out heads whereby it may be propagated like the other, so that it is at present not very common here. The leaves of this sort are longer and broader than those of the other, and are smooth, having three veins; the stalks which support the flowers are taller, and have two or three narrow leaves on each, which are placed alternate: on the top is one flower with long, narrow, Peach-coloured petals, which are reflexed; the middle or disk of hermaphrodite florets is very prominent, and of a dark purple colour, but the summits upon the stamina being of a gold colour, adds a lustre to the other. This sort may be treated in the same manner as the other, by sheltering of it in winter; it flowers at the same season, but the flowers are not of so long duration as those of the former.

The third sort grows naturally in several parts of North America; this is a biennial plant, which in warm summers perfects its seeds in England; the lower leaves of this sort are divided into three lobes, but those upon the stalks are undivided; they are hairy, and shaped like those of the first sort; the stalks branch out on their sides, and are better garnished with leaves than either of the other. The flowers are very like those of the first sort, but are smaller; the plants will live through the winter in the open air in mild seasons, and may be propagated by slips or heads; but the best way is to raise the plants from seeds, because those will flower much better than such as are procured by slips; the second year the seedling plants will flower, and produce ripe seeds.

The fourth sort grows naturally in most parts of North America, and has been long an inhabitant in the European gardens, where it was generally known by the title of Sunflower. The root of this is perennial, but the stalk is annual; the lower leaves are composed of five broad lobes, which are deeply cut into acute points, and some of them are jagged almost to the midrib; the outer lobe is frequently cut into three deep segments. The stalks rise seven or eight feet high, and divide upward into several branches; they are smooth, green, and garnished with single leaves, which are oval and heart-shaped; some of these are indented on their edges, others are entire. The foot-stalks which sustain the flowers are naked, and terminated by a single flower with yellow petals or rays, shaped like those of the Sunflower, but smaller. This does not produce seeds here, but is easily propagated by parting of the roots, in the same manner

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manner as the perennial Sunflower. It is very hardy in respect to cold, but loves a moist soil.

The fifth sort has a perennial root like the former, and is a native of the same country. This hath smooth green stalks, which rise higher than those of the former; the leaves are all composed of five lobes which are much narrower, and end with sharper points than those of the former, and are very acutely indented on their sides. The flowers are smaller, and the petals narrower than those of the former sort, but appear at the same season. It is equally hardy with the former, and may be propagated in the same way.

The sixth sort grows naturally in North America, and also in Siberia, from both which countries I have received the seeds. This hath a perennial root like the two former; the leaves at bottom are composed of seven or nine lobes, some of which are entire, and others are jagged to the midrib, they are of a dark green and smooth; the stalks rise six feet high, and divide into many branches. They are of a purple or iron colour, and are very smooth; these are garnished with leaves, which toward the bottom are hand-shaped, and composed of five lobes; higher up they have but three, and at the top the leaves are single. The flowers are smaller than those of the two former sorts, but are of the same shape and colour.

The seventh sort grows naturally in Virginia. This hath a perennial root; the stalks rise four or five feet high; the leaves are narrow, smooth, and placed opposite; the rays of the flower are long, yellow, and are twelve in number; the disk of male florets are of a dark red, and the scales of the empalement spread, and are almost awl-shaped.

These four last mentioned sorts may be propagated in plenty, by parting of their roots; the best time for this is in October, when the stalks will begin to decay; for if they are removed in the spring, they will not produce many flowers the same year. They love a moist soil, and should be allowed room, for if they are too near other plants, they will rob them of their nourishment and destroy them. They are proper furniture for large gardens, where they may be allowed room, or in walks round fields, because they require little culture.

RUELLIA. Plum. Nov. Gen. 12. tab. 2. Lin. Gen. Plant. 702.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, which is cut into five narrow acute segments at the top, which are erect. It has one petal, with a tube the length of the cup, which spreads and inclines at the neck, but the brim spreads open, where it is cut into five segments, the two upper being large and reflexed. It hath four stamina situated in the spreading part of the tube, connected in pairs, terminated by short summits, and a roundish germen supporting a slender style, crowned by a bifid stigma. The germen afterward becomes a taper capsule, pointed at each end, having two cells, inclosing roundish compressed seeds.

This genus of plants is ranged in the second section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two short stamina, and the seeds are included in a capsule.

The SPECIES are,

1. **RUELLIA** (*Tuberosa*) foliis ovatis crenatis, pedunculis bifloris. *Ruellia with oval crenated leaves, and foot-stalks bearing two flowers.* Ruellia humilis, flore cæruleo, asphodeli radice. Plum. Nov. Gen. 12. *Dwarf Ruellia, with a blue flower and an Asphodel root.*
2. **RUELLIA** (*Strepens*) foliis petiolatis, floribus verticillatis subsessilibus. Hort. Upsal. 178. *Ruellia with leaves having foot-stalks, and flowers growing in whorls, sitting close to the stalks.* Ruellia strepens, capitulis comosis. Hort. Elth. 328. *Snapping Ruellia with hairy heads.*
3. **RUELLIA** (*Clandestina*) foliis petiolatis, pedunculis longis subdivisis nudis. Lin. Hort. Upsal. 179. *Ruellia with leaves having foot-stalks, and long naked foot-stalks to the flowers, which are divided.* Ruellia cap-

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fulis teretibus. Hort. Elth. 328. *Ruellia with taper capsules.*

4. **RUELLIA** (*Crispa*) foliis subcrenatis lanceolato-ovatis, capitulis ovatis, foliosis hispidis. Lin. Sp. Plant. 635. *Ruellia with oval spear-shaped leaves which are somewhat crenated, oval pods, and prickly, hairy, small leaves.*

5. **RUELLIA** (*Paniculata*) foliis integerrimis pedunculis dichotomis lateralibus calycibus sessilibus, lacinia suprema majore. Lin. Sp. Plant. 885. *Ruellia with entire leaves, a forked stalk, and the upper segment of the flower large.* Speculum veneris majus impatiens. Sloan. Hist. Jam. 1. p. 158.

The first sort grows naturally in many of the islands in the West-Indies; the roots of this are composed of many swelling fleshy tubers, which run deep into the ground, and are like those of the Day Lily, but smaller. The stalk rises about four or five inches high, and sends out two or three short side branches, which are garnished with leaves placed opposite; some of these are small and shaped like a spatula, others are much larger; they have short foot-stalks, and are a little crenated on their edges. The flowers are produced on the side, and at the end of the stalk; those on the side have two flowers upon each foot-stalk, which come out opposite at each joint, but those at the top sustain three. The flowers have narrow tubes about an inch long, then they spread out to a sort of bell-shape, and at the top they are cut into five obtuse segments, which are large and spread open; they are of a fine blue, but of short duration, each flower seldom lasting in beauty one day; after the flower fades, the germen becomes a taper pod one inch and a half long, having two cells, which, when ripe, burst with a touch, and cast out the seeds to a distance. It flowers in July, and the seeds ripen the beginning of September.

The second sort grows naturally in Carolina; the root of this is fibrous and perennial; the stalks rise about a foot high, they are four-cornered, and have two longitudinal furrows, one on each side; the joints are three or four inches asunder, at each stand two oval leaves upon very short foot-stalks. The flowers come out from the wings of the leaves on each side, two or three rising from the same point, sitting very close to the stalks; they are small and of a pale purple colour, but are very fugacious; they open early in the morning, but are gone by ten or eleven o'clock in the forenoon; these are succeeded by short taper pods, surrounded by the hairy segments of the empalement. It flowers and perfects its seeds about the same time as the former.

The third sort grows naturally in the West-Indies; this hath a perennial root, composed of many fleshy fibres; the leaves and stalks lie close to the ground; the stalks grow five or six inches high; the leaves are placed by pairs at each joint; they are two inches long, and one inch and a quarter broad, standing upon foot-stalks half an inch long. The foot-stalks which sustain the flowers are naked, and divide into two smaller, each sustaining one small purple flower, which is very fugacious; their empalements are cut into very narrow segments to the bottom. After the flowers are past, the germen becomes a taper capsule about an inch long, including roundish compressed seeds.

The fourth sort grows naturally in both Indies; I received the seeds of this from Carthagenia in New Spain. This hath a ligneous creeping root; the stalks rise about five or six inches high, they are single, taper, and jointed; the leaves are oval, spear-shaped, and have very short foot-stalks; they are a little waved on their edges, are hairy and curled. The flowers are produced from the side of the stalk at their joints; these sustain one small yellow flower, coming out between rough, hairy, small leaves. It flowers in July, and the seeds ripen in September.

The fifth sort hath a perennial root; the stalks rise four or five feet high, are very diffused and forked, and garnished with oblong, oval, entire leaves placed

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opposite, standing on short foot-stalks which are hairy; the flowers are produced at the divisions of the stalks; they are small, purple, and of short duration.

These plants are propagated by seeds, which must be sown early in the spring in pots filled with light rich earth, and plunged into a moderate hot-bed; and when the plants come up, they must be transplanted each into a separate small pot filled with rich earth, and plunged into a hot-bed of tanners bark, where they must be shaded from the sun until they have taken new root; after which time they must have free air admitted to them every day in warm weather, and be constantly watered three or four times a week during the summer season. If the plants thrive well, those of the first and third sorts will produce flowers the July following, and will perfect their seeds in August; but the roots will continue, provided they are plunged into the bark-bed in the stove, and kept in a moderate temperature of heat.

The second sort is not a plant of long continuance, seldom abiding longer than two years; but if it is treated in the same manner as the two other, it will ripen seeds the second year, so may be propagated easily.

The fourth sort does not so constantly produce seeds as the three others, so it is not so common in England at present. This requires the same treatment as the other sorts.

If the seeds of these sorts are permitted to scatter, as their pods discharge them with a violent spring into the neighbouring pots, the plants will come up without care, so may be transplanted into pots filled with fresh loamy earth, and plunged into the tan-bed.

RUMEX. Lin. Gen. Plant. 407. Lapathum. Tourn. Inf. R. H. 504. tab. 287. Dock,

The CHARACTERS are,

The empalement of the flower is permanent, composed of three obtuse reflexed leaves. The flower has three petals which are larger than the empalement, to which they are very like. It hath six short hair-like stamina, terminated by erect twin summits, and a three-cornered germen supporting three hair-like reflexed styles, thrusting out of the clefts of the petals, crowned by large jagged stigmas. The germen afterward becomes a three-cornered seed, included in the petals of the flower.

This genus of plants is ranged in the third section of Linnæus's sixth class, which includes those plants whose flowers have six stamina and three styles; to which he has joined the Acetosa, or Sorrel of Tournefort, whose characters agree with those of the Dock; but as in the gardens and shops they are distinguished under different titles, I have separated the Sorrel from the Docks, and have placed them under their old title of Acetosa.

The SPECIES are,

1. RUMEX (*Patientia*) floribus hermaphroditis, valvulis integerrimis, foliis oblongo-lanceolatis. Dock with hermaphrodite flowers having entire valves, and oblong spear-shaped leaves. Lapathum hortense, folio oblongo, five secundum Dioscoridis. C. B. P. 114. Garden Dock with an oblong leaf, commonly called Patience, or Patience Rhubarb.
2. RUMEX (*Alpinum*) floribus hermaphroditis, valvulis integerrimis graniferis, foliis cordatis obtusis. Rumex with hermaphrodite flowers having entire valves bearing grains, and obtuse heart-shaped leaves. Lapathum folio rotundo Alpinum. J. B. 2. 987. Round-leaved Alpine Dock, called Monks Rhubarb.
3. RUMEX (*Aquaticus*) floribus hermaphroditis pedicellatis, foliis lanceolatis longissimis. Rumex with hermaphrodite flowers growing upon small foot-stalks, and the longest spear-shaped leaves. Lapathum aquaticum, folio cubitali. C. B. P. 116. Water Dock with a leaf a cubit long, commonly called Herba Britannica.
4. RUMEX (*Acutus*) floribus hermaphroditis, valvulis dentatis graniferis, foliis cordato-oblongis acuminatis. Hort. Cliff. 138. Rumex with hermaphrodite flowers, indented grain-bearing valves, and oblong heart-shaped leaves. Lapathum folio acuto, plano. C. B. P. 115. Plain sharp-pointed Dock.

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5. RUMEX (*Crispus*) floribus hermaphroditis, valvulis integris graniferis, foliis lanceolatis undulatis acutis. Lin. Sp. Plant. 335. Rumex with hermaphrodite flowers, entire grain-bearing valves, and acute, spear-shaped, waved leaves. Lapathum folio acuto, crispo. C. B. P. 115. Curled sharp-pointed Dock.
6. RUMEX (*Sanguineus*) floribus hermaphroditis, valvulis integerrimis, unica granifera foliis cordato-lanceolatis. Hort. Cliff. 138. Rumex with hermaphrodite flowers, entire valves, one only bearing a seed, and heart-formed spear-shaped leaves. Lapathum folio acuto rubente. C. B. P. 114. The bloody Dock.
7. RUMEX (*Aureus*) floribus hermaphroditis verticillatis, valvulis acutè dentatis, foliis lanceolatis. Rumex with hermaphrodite flowers growing in whorls, acutely indented valves, and spear-shaped leaves. Lapathum folio acuto, flore aureo. C. B. P. 114. Sharp-pointed Dock with a golden flower.
8. RUMEX (*Obtusifolius*) floribus hermaphroditis, valvulis dentatis, foliis cordato-oblongis, obtusiusculis crenulatis. Lin. Sp. 335. Rumex with hermaphrodite flowers, indented valves, and blunt, oblong, heart-shaped leaves. Lapathum vulgare, folio obtuso. J. B. 2. 985. Common broad-leaved Rumex, or Butter Dock.
9. RUMEX (*Pulcher*) floribus hermaphroditis, foliis lyratis. Guet. Stamp. 1. p. 7. Rumex with hermaphrodite flowers, and lyre-shaped leaves. Lapathum pulcrum Bononiense sinuatum. J. B. 2. p. 988. The Fiddle Dock.
10. RUMEX (*Maritimus*) floribus hermaphroditis, valvulis dentatis graniferis, foliis linearibus. Lech. Scan. 26. Rumex with hermaphrodite flowers, indented grain-bearing valves, and linear leaves. Lapathum aquaticum luteolæ folio. Bocc. Mus. 2. tab. 184. Water Dock with a Weld leaf.
11. RUMEX (*Chalepensis*) floribus hermaphroditis pedunculis longioribus, valvulis profundè dentatis, foliis cordato-oblongis. Rumex with hermaphrodite flowers growing upon longer foot-stalks, valves which are deeply indented, and oblong heart-shaped leaves. Lapathum chalepense folio acuto, seminum involucris profundè dentatis. Mor. Hist. 2. 58. Aleppo Dock with an acute leaf, and the covers of the seeds deeply indented.
12. RUMEX (*Aegyptiacus*) floribus hermaphroditis, valvulis trifido lictaceis, unica granifera. Hort. Upsal. 89. Rumex with hermaphrodite flowers, and bristly three-pointed valves, one of which bears the seed. Lapathum Aegyptiacum annuum, parietariæ folio, capsulâ feminis, longius barbata. Hort. Piss. Annual Egyptian Dock, with a Pellitory leaf, and long beards to the seed-vessels.
13. RUMEX (*Lunaria*) floribus hermaphroditis valvulis lævibus, caule arboreo, foliis subcordatis. Vir. Cliff. 32. Rumex with hermaphrodite flowers, smooth valves, a tree-like stalk, and leaves which are almost heart-shaped. Acetosa arborefcens subrotundo folio, ex insulis fortunatis. Pluk. Phyt. tab. 252. fig. 3. Tree Sorrel from the Fortunate Islands, with a roundish leaf.
14. RUMEX (*Bucephalophorus*) floribus hermaphroditis, valvulis dentatis nudis planis reflexis. Hort. Upsal. 90. Rumex with hermaphrodite flowers, and plain, naked, indented, reflexed valves. Acetosa ocymi folio, Neapolitana. C. B. P. 114. Naples Sorrel with a Basil leaf.
15. RUMEX (*Vesicarius*) floribus hermaphroditis geminatis, valvularum alis maximis membranaceis reflexis, foliis indivisis. Hort. Cliff. 130. Rumex with hermaphrodite flowers growing by pairs, very large membranaceous wings to the valves which are reflexed, and undivided leaves. Acetosa Americana foliis longissimis pediculis donatis. C. B. P. 114. American Sorrel, with very long leaves having foot-stalks.
16. RUMEX (*Roseus*) floribus hermaphroditis distinctis, valvularum alis maximis membranaceis reflexis, foliis erosis. Flor. Leyd. Prod. 230. Rumex with hermaphrodite flowers growing upon distinct spikes, very large membranaceous wings to the valves, and leaves appearing as if bitten. Acetosa Aegyptia roseo feminis involucro, folio lacero. Lipp. Egyptian Sorrel with a Rose-coloured cover to the seed, and a torn leaf.

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The first fort was formerly much more cultivated in the English gardens than at present; this has been generally used for the Monks Rhubarb, and has been thought the true, but others suppose the second fort should be used as such; the herb was formerly used in the kitchen, by the title of Patience. The root is large, and divides into many thick fibres which run downward; their outer cover is brown, but they are yellow within, with some reddish veins; the leaves are broad, long, and acute-pointed; their foot-stalks are of a reddish colour; the stalks rise from four to six feet high, and divide toward the top into several erect branches, which are garnished with a few narrow leaves, terminating with spikes of large staminate flowers. These appear in June, and are succeeded by pretty large three-cornered seeds whose coverings are entire, which ripen in autumn.

The second fort grows naturally on the Alps, but has been long cultivated in the English gardens. This hath large roots, which spread and multiply by their offsets; they are shorter and thicker than those of the first fort, of a very dark brown on their outside, and yellow within. The leaves are of the round heart-shape, about nine inches long, and as much in breadth near their base, having pretty long foot-stalks. The stalks rise from two to three feet high; they are very thick, and have a few small roundish leaves on the lower part, but the upper part closely garnished with spikes of white flowers, standing erect, close to the stalks. These appear the latter end of May, and are succeeded by large triangular seeds, which ripen in August.

The third fort grows naturally in ponds, ditches, and standing waters, in many parts of England; this is supposed to be the Britannica of the ancients. It hath large roots which strike deep into the loose mud, sending out leaves which are three feet long, and four inches broad in the middle, drawing to a point at each end. The stalks rise four feet when growing in water, but in dry land not more than two; these are garnished with narrow leaves among the spikes of flowers, to the top. The flowers stand upon slender foot-stalks which are reflexed; they are of an herbaceous colour, appear in June, and the seeds ripen in autumn.

The fourth fort grows naturally in moist places in many places of England; this is the Oxylapathum of the shops, which is directed by the College to be used in medicine; but the markets are supplied with roots of the common Docks, which are indifferently gathered by those who collect them in the fields, where the eighth fort is much more common than this. The roots of this fort are slender and run downright, sending out a few small fibres; the stalks rise about two feet high, which are garnished with leaves below, about four inches long, and one and a half broad in the middle; they are rounded at their base, where they are slightly indented, but end in acute points; they are plain, and slightly crenated on their edges. From the joints of the stalk come out alternately slender long foot-stalks, which sustain the spikes of flowers, which grow in small whorls round the stalks, at about an inch distance; these have scarce any leaves upon the foot-stalks between the whorls of flowers, so may be easily distinguished from the small Water Dock, which has many. This flowers in June, and the seeds ripen in autumn.

The fifth fort is more commonly found growing naturally about London than the fourth; the leaves of this are much longer than those of the former, and are indented on their sides, which are also waved; the stalks rise about the same height as those of the former. The spikes of flowers from the side are shorter, and closer garnished with flowers on pretty long foot-stalks; the covering of the seed is entire. It flowers and seeds about the same time with the former.

The sixth fort is very like the fourth in appearance, but the leaves have deep blood-coloured veins, and some small spots of the same on their surface; the stalks are red, and rise about the same height as the

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fourth, but the covering of the seed is entire; whereas those of the fourth are indented, so may be readily distinguished. It grows naturally in many parts of England.

The seventh fort grows naturally in several parts of England; this is a biennial plant, which perishes soon after the seeds are ripe; the stalks rise near two feet high; they are of a deep purple colour, and are garnished with spear-shaped leaves toward the bottom, which are four inches long, and almost one broad in the middle, but those on the upper part of the stalk are very narrow, and not more than two inches long; the spikes of flowers come out from the sides of the stalks alternately. The flowers grow in thick whorls which sit close to the stalks; these are of a bright yellow colour, and the covers of the seeds are sharply indented.

The eighth fort is the most common Dock by the sides of roads and banks in every part of England; the leaves of this fort are broad and rounded at their points, though some of them end more acutely than others; they are near a foot long, and five inches broad toward their base, having many transverse veins running from the midrib to their borders. The stalks rise from two to three feet high, branching out on their sides, having a few leaves on their lower part of the same shape with the other, but smaller. The flowers grow in whorls, sitting very close to the stalks; some plants have indented coverings to their seeds, and others have entire coverings; both these are frequently found intermixed, so that I doubt of their being distinct species. The leaves of this Dock were formerly much used for wrapping up of butter, and from thence the plant was called Butter Dock.

The ninth fort grows naturally in many places near London; this is a biennial plant, which perishes soon after the seeds are ripe. The stalks of this rise about a foot high, and branch out from the bottom; the leaves grow near the root; they are about two inches and a half long, and are hollowed on their sides, so as to resemble the sides of a fiddle; the stalks are generally bent at their joints. The flowers grow in whorls round the stalks, to which they fit very close; they are hermaphrodite; the covers of the seeds are sharply indented.

The tenth fort is sometimes found growing naturally in England, upon places where the water has stood in winter. This seldom rises more than five or six inches high, but divides into two or three branches; the leaves are about three inches long, and a quarter of an inch broad; they are smooth, and stand upon short foot-stalks. The flowers grow in whorls round the branches, to which they fit very close; these are succeeded by small triangular seeds, having indented covers.

The eleventh fort came originally from Aleppo; this is a biennial plant; the leaves are nine or ten inches long, smooth, and of a light green; they are three inches broad at their base, where they are indented, and end in acute points. The stalks rise from two to three feet high, sending out many branches from their sides, which are garnished with large whorls of herbaceous flowers, standing upon pretty long foot-stalks; these are succeeded by three-cornered seeds, whose coverings are deeply indented.

The twelfth fort grows naturally in Egypt; this is an annual plant; the stalk rises about ten inches high, sending out a few horizontal branches toward the bottom; the leaves are about two inches long, and half an inch broad at the broadest part. The flowers grow in whorls round the stalks, they are very small, and the hair-like beards which adhere to the covering of the seed being long, obscure the flowers, so they are scarce visible to the naked eye.

All these sorts of Docks rise easily from seeds, and if introduced into a garden, will become troublesome weeds, if their seeds are permitted to scatter; therefore few persons care to propagate any of them, except the two first sorts, which are cultivated for their use in medicine. The seeds of all the Docks should be sown

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sown in autumn soon after they are ripe, for those seeds which are sown in the spring rarely grow the same year: when the plants come up, they will require no other care but to thin them where they are too close, and keep them clean from weeds. They all delight in a moist rich soil.

The thirteenth sort is commonly known among the gardeners by the title of Sorrel-tree. This came originally from the Fortunate, or Canary Islands, but has been long an inhabitant in some English gardens; it rises with a ligneous stalk ten or twelve feet high, covered with a smooth brown bark, sending out many slender branches; these are garnished with smooth, roundish, heart-shaped leaves two inches long, and an inch and a half broad, standing alternately upon pretty long foot-stalks. The flowers come out in loose panicles toward the end of the branches; they are of an herbaceous colour, and are sometimes succeeded by triangular seeds with smooth covers, but they rarely ripen in England. This plant is easily propagated by cuttings, which may be planted in any of the summer months, in a bed of loamy earth, and shaded from the sun until they have taken pretty good root; then they should be taken up, and planted in pots filled with kitchen-garden earth, placing them in the shade till they have taken new root; after which they may be moved to a sheltered situation, and placed with other hardy green-house plants till autumn, when they must be removed into the green-house, and treated in the same way as other hardy kind of plants, which only want protection from frost.

The fourteenth sort is a low annual plant, which grows naturally in Italy and Spain; this is generally found on swampy moist ground; the stalks are slender, branching at the bottom, and rise about four inches high; the lower part is garnished with small, oval, succulent lobes; their upper part is furnished with small herbaceous flowers growing in whorls, and have no leaves between them; they are succeeded by small seeds, whose covers are sharply indented and reflexed. These appear in June, and the seeds ripen in August, which, if permitted to scatter, will furnish a supply of young plants the following spring; or if the seeds are then sown, the plants will come up the following spring, and require no other care but to thin them, and keep them clean from weeds.

The fifteenth sort is an annual plant; this hath pretty thick succulent stalks, which rise a foot high, and divide into many branches; the leaves are of the round heart-shape and undivided, having very long foot-stalks. The flowers grow in loose spikes at the end of the branches; these are herbaceous, and are succeeded by large covers to the seeds, which are inflated, and have broad membranaceous borders; the seeds are triangular, and ripen in autumn.

The sixteenth sort grows naturally in Egypt; this is also an annual plant, whose stalks rise a foot and a half high, dividing upward into several branches; the stalks are garnished with arrow-pointed leaves about three inches long, whose sides are irregularly torn, as if they had been gnawed by insects; they stand upon pretty long foot-stalks, and have smooth surfaces; the flowers are disposed in loose spikes; some spikes have only male flowers, and others have all hermaphrodite flowers, and some plants have only male, and others hermaphrodite flowers. The latter are succeeded by triangular seeds, inclosed in large inflated covers of a deep red colour, having membranaceous borders. The seeds of this ripen in autumn.

The seeds of both these sorts grow very freely, if sown in a bed of light earth in the spring, where the plants are designed to remain. When they come up, they will require no other care but to keep them clean from weeds, and thin them where they are too close.

RUSCUS. Tourn. Inst. R. H. 79. tab. 15. Lin. Gen. Plant. 1008. [so called of rusticus, because rough and prickly. It is also called Laurus, because fit for the making of Laurel garlands; and Alexan-

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drina, from one of the sorts growing in Alexandria.] Knee-holly, or Butcher's-broom; in French *Houx-frelon*.

The CHARACTERS are,

It hath male and female flowers in distinct plants; the male flowers have erect spreading empalements, composed of six oval convex leaves, whose borders are reflexed; they have no petals, but have an oval nectarium the size of the empalement, which is erect and inflated, opening at the mouth; they have no stamina, but each has three spreading summits, sitting on the top of the nectarium, which are joined at their base. The female flowers have empalements but no petals, and nectariums like the male: they have no stamina, but have an oblong oval germen hid within the nectarium, supporting a cylindrical style, crowned by an obtuse stigma, standing above the mouth of the nectarium. The germen afterward becomes a globular berry with two or three cells, inclosing two globular seeds.

This genus of plants is ranged in the twelfth section of Linnæus's twenty-second class, which contains the plants which are male and female in distinct plants, and the stamina or summits are joined together.

The SPECIES are,

1. *Ruscus (Aculeatus) foliis supra floriferis nudis.* Hort. Cliff. 465. *Ruscus with leaves which bear flowers on their upper side, and are naked.* *Ruscus myrtifolius aculeatus.* Tourn. Inst. 79. *Knee-holly, or Butcher's-broom, with prickly Myrtle leaves.*
2. *Ruscus (Hypophyllum) foliis subtus floriferis nudis.* Hort. Cliff. 465. *Ruscus with leaves which bear flowers on the under side of the leaves, which are naked.* *Ruscus latifolius, fructu folio innascente.* Tourn. Inst. 79. *Butcher's-broom with broad leaves, upon which the fruit grows.*
3. *Ruscus (Hypoglossum) foliis subtus floriferis sub foliolo.* Hort. Cliff. 465. *Ruscus with flowers under the leaves.* *Ruscus angustifolius, fructu folio innascente.* Tourn. Inst. 79. *Butcher's-broom with narrow leaves, and fruit sitting upon the leaves.*
4. *Ruscus (Racemosus) racemo terminali hermaphrodite.* Hort. Cliff. 469. *Ruscus with hermaphrodite flowers in long bunches terminating the stalks.* *Ruscus angustifolius, fructu summis ramulis innascente.* Tourn. Inst. 79. *Butcher's-broom with narrow leaves, and fruit growing at the top of the branches.*
5. *Ruscus (Trifoliatum) foliis ternis ovatis acuminatis, supra floriferis nudis.* *Ruscus with oval acute-pointed leaves which are placed by threes, and flowers on their upper side.*
6. *Ruscus (Flexuosus) foliis ovatis acuminatis, supra floriferis nudis, caulibus flexuosis.* *Ruscus with acute-pointed leaves bearing flowers on their upper side, and flexible stalks.* *Ruscus latifolius major fructu folio innascente.* Michel. *Greater broad-leaved Ruscus with fruit sitting upon the leaf.*
7. *Ruscus (Androgynus) foliis margine floriferis.* Hort. Cliff. 464. *Ruscus with flowers growing on the borders of the leaves.* *Ruscus latifolius e foliorum sinu florifer & fructifer.* Hort. Elth. 532. tab. 250. *Broad-leaved Ruscus, with flowers and fruit growing on the edges of the leaves.*
8. *Ruscus (Frutescens) caule fruticoso ramoso, foliis lanceolatis rigidis, floribus pedunculatis terminalibus.* *Ruscus with a shrubby branching stalk, spear-shaped stiff leaves, and flowers growing upon foot-stalks terminating the branches.* *Ruscus latifolius frutescens, floribus racemosis rubris.* Houst. MSS. *Shrubby broad-leaved Ruscus, with branching red flowers.*

The first sort is very common in the woods in divers parts of England, and is rarely cultivated in gardens. The roots of this kind are sometimes used in medicine, and the green shoots are cut, bound into bundles, and sold to the butchers, who use it as besoms to sweep their blocks, from whence it had the name of Butcher's-broom. It is also called by some Knee-holly.

This hath roots composed of many thick white fibres, which strike deep in the ground, and twine about each other, from which arise several stiff green stalks,

stalks, which rise about three feet high, sending out from their side several short branches, which are garnished with stiff, oval, heart-shaped leaves, placed alternately on every part of the stalk; they are about half an inch long, and one third of an inch broad near their base, ending with sharp prickly points. The flowers are produced on the upper side of the leaves just in the middle; these are male in some, and female in other plants; they are small, and cut into six parts, of a purple colour, sitting close to the midrib; they appear in June, and the female flowers are succeeded by berries almost as large as Cherries, of a sweetish taste, which ripen in winter, when they are of a beautiful red colour.

As this plant grows wild in most parts of England, it is rarely admitted into gardens; but if some of the roots are planted under tall trees in large plantations, they will spread into large clumps; and as they retain their leaves in winter, at that season, they will have a good effect. The seeds of this plant generally lie a year in the ground before they vegetate, and the plants so raised are long before they arrive to a size enough to make any figure, so it is not worth while to propagate them that way, especially as the roots may be easily transplanted from the woods. The roots and seeds of this plant have been used in medicine; the roots are aperitive, and esteemed good for removing obstructions; the seeds are an ingredient in the composition of the *benedicta laxativa*: the young shoots of this plant in the spring are sometimes gathered and eaten by the poor like those of *Asparagus*; the branches of this plant, with their ripe fruit upon them, are frequently cut, and put into basins of sand, mixing them with the stalks of ripe seeds of male Piony, and those of the wild Iris or Gladwyn, which together make a pretty appearance in rooms, at a season of the year when there are few flowers, and these will continue a long time in beauty.

The second sort grows naturally in the mountainous parts of Italy, but is preserved for the sake of variety in many English gardens. The roots of this have large knotty heads, with long thick fibres like those of the former sort, from which arise many tough limber stalks near two feet high; these are garnished by stiff, oblong, oval leaves ending in points, which are more than two inches long and almost one broad; they are placed alternately on the stalks; the flowers are produced on the under surface of the leaves near the middle, sitting close to the midrib; they are small, and of an herbaceous white colour; the female flowers are succeeded by small red berries about the size of those of Juniper. This flowers in July, and the seeds ripen in winter.

It stands in most dispensaries among the plants used in medicine, and has been commended for opening obstructions of the kidneys, and to provoke urine.

The third sort grows naturally upon shady mountains in Italy, Hungary, and other parts of Europe. The root of this is composed of many thick fibres like those of the former, from which arise many tough limber stalks which are about ten inches high, garnished with spear-shaped leaves about three inches long and one broad in the middle, drawing to a point at both ends; they have several longitudinal veins, which run from the foot-stalk to the point, diverging from the midrib in the middle, but join again at the point; the leaves are for the most part alternate, but sometimes they are opposite. On the middle of the upper surface of these, comes forth a small leaf of the same shape; and at the same point, from the bosom of the small leaves, come out the flowers, which are of a pale yellow colour. The female flowers are sometimes succeeded by berries almost as large as those of the first sort, which ripen in winter, and are red. This is sometimes called *Bislingua*, or *Double Tongue*, from the leaves growing one out of another. It stands in dispensaries as a medicinal plant, but is seldom now used.

The fourth sort grows naturally in the Archipelago, but is frequently planted in the English gardens; it

is called *Laurus Alexandrina*, i. e. *Alexandrian Bay*, and is supposed to be the plant with which the ancient crowned their victors and poets. The stalks of this being very pliable, may be easily wrought into coronets for this purpose; and the leaves of this plant, having a great resemblance to those which are represented on the antient busts, seem to confirm this opinion.

The roots of this are like those of the former species; the stalks are slender, and much more pliable; they rise about four feet high, and send out many side branches, which are garnished with oblong acute-pointed leaves about two inches long, and one-third of an inch broad, rounded at their base, but end in acute points; they are smooth, and of a lucid green, placed alternately, and sit close to the branches. The flowers are produced in long bunches at the end of the branches; these are hermaphrodite, of an herbaceous yellow colour, and are succeeded by berries like those of the first sort, but smaller, which ripen in winter.

The fifth sort grows naturally in Zant, and some of the other islands in the Morea. The roots of this are like those of the former sorts; the stalks rise about two feet high, they are slender, pliable, and garnished with oval leaves placed by threes round the stalk; they are about two inches long, and one broad, rounded at both ends, terminating in acute points, and have several longitudinal diverging veins running from the foot-stalk to the point. The flowers grow on the under side of the leaves, fastened to the midrib; they are naked, and have pretty long foot-stalks; the segments or petals are very narrow; the fruit I have not seen, so can give no account of it.

The sixth sort grows naturally in Italy, where it was discovered by Signior Micheli of Florence. The roots of this are much longer than those of the first sort; the stalks rise near five feet high; they are very pliant, send out several side branches their whole length, which are garnished with stiff oval leaves ending in acute points; they are one inch long, and half an inch broad. The flowers are produced on the upper surface of the leaves, sitting close to the midrib; they are small, and of an herbaceous white colour. These are succeeded by berries which are smaller than those of the first sort, and are of a pale red when ripe.

All these sorts are very hardy, and will thrive in almost any soil or situation, so are very proper for planting round the verges of close woods, or under large trees in wilderness quarters; for, as they are always green, they make a good appearance in winter, after the deciduous trees have cast their leaves; they are easily propagated by parting of their roots. The best time for this is in autumn; but, when this is performed, the roots should not be divided into small parts, because that will weaken them so much, that they will make but little figure, until they have had two or three years growth; they may also be propagated by sowing of their seeds, but this is a very tedious method, so is seldom practised.

The seventh sort grows naturally in the island of Madeira; this sends out pliant stalks, which rise seven or eight feet high, and have several short branches proceeding from their sides, which are garnished with stiff leaves about two inches long, and one broad toward their base, where they are rounded to the foot-stalk, but end in acute points; they have a great number of longitudinal veins running from the foot-stalk to the point. The flowers are produced in clusters on the edges of the leaves; they are white, and are succeeded by berries of a yellowish red colour, not so large as those of the first sort.

This sort is tender, and must therefore be planted in pots filled with fresh earth, and in winter removed into the green-house, but it should be placed where it may have free air in mild weather; for it only requires to be screened from frost, and in the summer it must be set abroad with other hardy green-house plants. With this management the plants will send forth stems six or eight feet high, furnished with

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leaves from bottom to top, and in June will be closely set with flowers upon their edges, which make a very beautiful and odd appearance, and renders it worthy of a place in every good collection of plants. This is also propagated by parting the roots as the former, which should not be done very often; because, if the roots are not permitted to remain some time to get strength, they will produce but weak shoots, and very few flowers; and in the strength of their shoots and number of flowers, the greatest beauty of these plants consist. This sort grows plentifully at Madeira, from whence the seeds may be procured; but these commonly lie in the ground a year before the plants come up, so should be sown in pots filled with fresh earth, and placed under a hot-bed frame in winter to screen the seeds from the frost, and the following spring the plants will appear.

The eighth sort was discovered by the late Dr. Houstoun, growing naturally at Carthage in New Spain; this rises with shrubby stalks eight or ten feet high, which divide into many branches, and are garnished with stiff spear-shaped leaves three inches long, and one broad in the middle, ending in acute points; they are sometimes ranged in whorls round the stalks, and at others they are opposite. The flowers are produced in loose bunches at the end of the branches, standing upon slender foot-stalks; they are small, of a red colour, and shaped like those of the first sort.

This plant is tender, so must be kept in a stove during the winter, otherwise it will not live in England.

R U T A. Tourn. Inst. R. H. 257. tab. 133. Lin. Gen. Plant. 469. [This plant is called Ruta, of *ῥῦδ* to preserve, because it is a plant very good to preserve health.] Rue.

The CHARACTERS are,

The flower has a short permanent empalement cut into five parts; it has four or five oval petals which spread open, and are narrow at their base, and eight or ten awl-shaped spreading stamina the length of the petals, crowned by short erect summits, with a gibbous germen having a cross furrow, marked with ten spots, supporting an erect awl-shaped style crowned by a single stigma. The germen afterward becomes a gibbous capsule with five lobes and five cells opening in five parts at the top, and filled with rough angular seeds.

This genus of plants is ranged in the first section of Linnæus's tenth class, which contains those plants whose flowers have ten stamina and one style.

The SPECIES are,

1. RUTA (*Hortensis*) foliis decompositis, floribus octandris, staminibus corollâ longioribus. Rue with decomposed leaves, and flowers having eight stamina which are longer than the petals. Ruta hortensis latifolia. C. B. P. 336. Broad-leaved Garden Rue.
2. RUTA (*Alterâ*) foliis decompositis, foliolis oblongo-ovatis, staminibus corollâ æquantibus. Rue with decomposed leaves, the small leaves oblong and oval, and stamina equalling the petals. Ruta hortensis altera. C. B. P. 336. Another Garden Rue.
3. RUTA (*Sylvestris*) foliis inferioribus decompositis, foliolis linearibus, summis quinquefidis trifidisque. Rue with decomposed linear leaves below, and the upper ones five or three-pointed. Ruta sylvestris minor. C. B. P. 336. Smaller wild Rue.
4. RUTA (*Chalepensis*) foliis decompositis, floribus decandris marginibus petalorum ciliatis. Rue with decomposed leaves, flowers having ten stamina, and the borders of the petals of the flower hairy. Ruta Chalepensis latifolia, florum petalis villis scatentibus. H. L. Broad-leaved Aleppo Rue with hairy petals to the flower.
5. RUTA (*Ciliatis*) foliis compositis, floribus decandris, petalis florum ciliatis. Rue with compounded leaves, flowers having ten stamina, and hairy petals to the flower. Ruta Chalepensis tenuifolia, florum petalis villis scatentibus. Mor. Hist. 2. 503. Narrow-leaved Aleppo Rue, with hairy petals to the flower.
6. RUTA (*Linifolia*) foliis simplicibus indivisis. Lin. Sp. Plant. 384. Rue with single undivided leaves. Ruta

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sylvestris linifolia Hispanica. Bocc. Mus. 2. p. 82. Wild Spanish Rue with a Flax leaf.

7. RUTA (*Montana*) caule erecto corymbofo, foliis compositis, floribus decandris, staminibus corollâ longioribus. Rue with an erect corymbus stalk, compound leaves, and flowers having ten stamina which are longer than the petals. Ruta sylvestris montana. Clus. Hist. Wild Mountain Rue.

8. RUTA (*Patavina*) foliis terminatis sessilibus. Lin. Sp. 549. Rue with leaves without foot-stalks terminating the branches. Pseudo Ruta patavina trifolia, floribus luteis umbellatis. Michel. Gen. 22. tab. 19. Bastard Rue with trifoliate leaves, and yellow flowers in umbels.

The first sort is the common Rue, which has been long cultivated in the gardens, and is that which is directed to be used in medicine, but of late years the second sort has so generally prevailed, as almost to supplant the first in the gardens about London; that being hardier than the first, is not so liable to be killed by severe frost.

The first rises with a shrubby stalk to the height of five or six feet, sending out branches on every side, garnished with decomposed leaves, whose small leaves (or lobes) are wedge-shaped; they are of a gray colour, and have a strong odour. The flowers are produced at the end of the branches, in bunches almost in form of umbels; they are composed of four yellow concave petals, which are cut on their edges, and eight yellow stamina which are longer than the petals, terminated by roundish summits. The germen becomes a roundish capsule, with four lobes punched full of holes, containing rough black seeds. It flowers in June, and the seeds ripen in autumn.

The second sort hath a shrubby stalk which rises three or four feet high, sending out many branches garnished with decomposed leaves, which are narrower than those of the former sort; they are of a bluish gray colour, and have a strong odour. The flowers grow in longer and looser bunches than the former; they have four short, concave, yellow petals, and eight short stamina of equal length with the petals. The seed-vessel is like that of the former, but smaller. This sort is more commonly to be found in gardens than the first.

The third sort grows naturally in Spain. The lower leaves of this are compounded of several parts, which are joined to the midrib in the same manner as other branching winged leaves, and are garnished with small linear leaves, standing without order. The stalks rise from two to three feet high, branching out from the bottom; these are garnished with leaves which are divided into five parts, and those at the top into three, which are as small and narrow as those at the bottom; they are of a gray colour, but are not so stinking as those of the other. The flowers grow at the end of the branches in loose spikes, which are generally reflexed; the petals of the flower are yellow, and appear in June; these are succeeded by small seed-vessels filled with angular black seeds. It flowers in June, and the seeds ripen in autumn.

The seeds of the fourth sort came from Aleppo, and it has also been brought from the Cape of Good Hope; this hath strong shrubby stalks which rise about three feet high, dividing into many branches, which are garnished with decomposed leaves larger than those of the common sort, and have a stronger odour. The flowers are disposed almost in form of an umbel at the end of the branches; they have five concave yellow petals, whose borders are set with fine hairs, and ten stamina which are of equal length with the petals. This sort flowers in June, and the seeds ripen in autumn. The seed-vessels of this are much larger than those of the common sort.

The fifth sort grows naturally at Aleppo; this hath shrubby stalks, which are smaller, and do not rise so high as those of the former sort. The leaves are much narrower and grayer than those, but have the same strong odour; the flowers are smaller, and have five petals, which are pretty close set with small hairs;

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hairs; they have ten thick stamina, five of which are alternately longer than the petals; the seed-vessels are like those of the first sort.

The sixth sort grows naturally in Spain; this rises with several single stalks from the root near a foot and a half high, which are garnished with single leaves about three quarters of an inch long, and one eighth of an inch broad; they are of a yellowish green colour, and are placed alternately on the stalks, to which they fit pretty close; at the base of these come out one or two very small leaves, of the same shape and colour. The flowers grow in small clusters at the end of the stalks; they have each five oblong yellow petals, and ten stamina of equal length with them, terminated by awl-shaped summits. This flowers in June, and the seeds ripen in autumn; the plants are generally biennial in England.

The seventh sort rises with an erect stalk about two feet high, garnished with compound leaves, whose smaller leaves are narrow and obtuse, of a grayish colour, but have not so strong an odour as the former. The upper part of the stalk divides in form of a corymbus, sustaining upon naked foot-stalks small bunches of yellow flowers, which have five concave petals, and ten stamina which are much longer than the petals, terminated by roundish summits.

The eighth sort grows near Padua; this seems to be a plant of short duration; the stalk rises singly from the root, is about a foot high, herbaceous, and garnished with narrow trifoliate leaves placed alternately on the stalk, to which it closely adheres; the stalk branches at the top in form of an umbel, sustaining many yellow flowers, composed of five plain petals, having no hairs on their borders. It is propagated by seeds, which if sown in the autumn, soon after it is ripe, the plants will come up the following spring; but when the seeds are sown in the spring, the plants seldom rise the same year. If these grow upon poor ground, or in rubbish and in a warm situation, they will live in the open air without covering, but in rich ground they are frequently killed in winter.

All these plants may be propagated either by sowing of their seeds, or by planting slips or cuttings; both of which may be done in the spring. The manner of propagating them from cuttings being the same as for Lavender, Stæchas, and other hardy aromatic plants, need not be here repeated; and if they are propagated by seeds, there needs no farther care but to dig a bed of fresh earth in the spring, making it level; then to sow the seed thereon, and rake the ground smooth; after which, you must observe to keep the bed clear from weeds until the plants are come up about two inches high, when they should be transplanted out into fresh beds, where they may remain for use. All these plants must have a dry soil, otherwise they are very subject to be destroyed in winter. The two Aleppo Rues, and the wild Rues are tenderer than the common sort, so require shelter in winter; but the Aleppo Rues will endure our ordinary winters very well in the open air, especially if they are planted on a dry soil.

The sixth and seventh sorts are tenderer than either of the other, and are of shorter duration. The seeds of the seventh sort were sent me from Gibraltar Hill, where the plant grows naturally; this doth not ripen its seeds here, unless the summers are warm; and in hard winters the plants are generally killed, unless they are removed into shelter.

The sixth sort will live through the winter in the open air, provided it is planted in a poor dry soil, and the second year it will perfect seeds; but as it is of a short duration, young plants should be annually raised to succeed the others.

All the sorts of Rue will live much longer, and are less liable to be injured by frost in winter, when they grow in a poor, dry, rubbishy soil, than in good ground; for in rich moist land the plants grow very vigorously in summer, and are so replete with moisture, that a small frost will kill their tender shoots; where-

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as in poor dry ground, or when they grow upon old walls, their growth will not be great, but their shoots will be hard and compact; so are more able to resist the cold.

The first sort was formerly used to plant for edgings on the sides of borders; it was then called Herb of Grace, but was by no means proper for this use, for the plants shoot so vigorously, that there is no keeping them within the bounds of an edging; besides, when they are kept closely sheered, they appear to be very ragged and stumpy, and their roots spread so far as to exhaust the goodness of the soil, so that the other plants would be deprived of their nourishment, which reasons have caused them to be wholly neglected for this purpose; so that at present they are chiefly cultivated for medicinal use, or to furnish the balconies for the citizens in the spring, especially that with a variegated leaf.

RUTA CANINA. See SCROPHULARIA.

RUTA MURARIA, Wall-rue, or white Maiden-hair.

This plant is found growing out of the joints of old walls in divers parts of England, where it is gathered for medicinal use; but as it cannot be cultivated in gardens, so as to grow to advantage, I shall not say any thing more of it in this place.

RUYSCHIANA. Boerh. Ind alt. 1. p. 172. Dracocephalum. Lin. Gen. Plant. 648.

The CHARACTERS are,

The flower hath a permanent empalement of one leaf, which is tubulous, and is cut into five segments at the top, the upper one being broader and blunter than the other; it is of the lip kind, having one petal which has a tube longer than the empalement. The chaps are large and swelling; the upper lip is erect and arched; it is gently indented at the top; the lower lip is trifid; the two side segments are narrow, and stand erect; the middle is broad, reflexed, and indented at the point. It hath four stamina, two of which are long, and situated under the upper lip; the other two are shorter, and situated just below them; they are terminated by oblong summits fastened in the middle: it has four germen situated at the bottom of the empalement, supporting a slender style the length of the stamina, crowned by a bifid reflexed stigma. The germen afterward become four oblong seeds which ripen in the empalement.

This genus of plants is joined to the Dracocephalum by Dr. Linnæus, which is ranged in the first section of his fourteenth class, containing the plants whose flowers have two long and two shorter stamina, and are succeeded by naked seeds ripening in the empalement.

The SPECIES are,

1. RUYSCHIANA (*Spicata*) floribus spicatis, foliis bracteisque linearibus glabris indivisis. *Ruyschiana with spiked flowers, linear leaves, and bractæ which are smooth and undivided.* Ruyschiana flore cæruleo magno. Boerh. Ind. alt. 1. p. 172. *Ruyschiana with a large blue flower.*
2. RUYSCHIANA (*Laciniata*) floribus spicatis, foliis linearibus trifidis hirsutis. *Ruyschiana with spiked flowers, and hairy, linear, three-pointed leaves.* Ruyschiana hirsuta, foliis laciniatis. Amman. Ruth. 50. *Hairy Ruyschiana with jagged leaves.*
3. RUYSCHIANA (*Verticillata*) floribus axillaribus, foliis lanceolatis dentatis glabris. *Ruyschiana with flowers growing at the wings of the stalks, and smooth, indented, spear-shaped leaves.* Dracocephalon foliis ex lanceolato-linearibus rariùs dentatis spinulosis, floribus gemellis. Gmel. *Dragon's-head with linear spear-shaped leaves which are rarely indented, and somewhat prickly, and flowers growing by pairs.*

The first sort grows naturally in Austria and Hungary; this hath a perennial root, and an annual stalk, which is four-cornered, and rises about two feet high, garnished with two smooth linear leaves at each joint, about one inch long, and one-eighth of an inch broad, with a deep furrow along the middle; and at each joint, at the other sides of the stalk,

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stalk, come out two or three very narrow small leaves of the same shape. The flowers are produced in whorled spikes at the top of the stalks, having small narrow leaves under each whorl. The flowers have tubulous empalements of one leaf, which are cut into five segments at the top, four of which are narrow, and end in acute points; the other, which is on the upper side of the flower is broader, and is rounded at the point. The tube of the flower is longer than the empalement, and is swelling and large at the chaps; the upper lip is broad, erect, and arched over the tube; the lower lip is shorter, and has two short side segments which are erect, but the middle segment is broad, rounded, and indented at the point, and is reflexed back to the tube. It has four stamina which lie close under the upper lip, and are arched in the same manner; two of these are as long as the style, which stands in the same position; the other two are shorter, and are situated just below the other; they are terminated by oblong summits, which are fastened in the middle to the stamina. The style is crowned by a bifid, reflexed, narrow stigma; the flowers appear in June, and are of a fine blue colour; these are each succeeded by four oblong seeds, which ripen in the empalement. The second sort grows naturally in Siberia; this was sent me by the late Dr. Amman, who was professor of botany at Peterburgh; it hath a perennial root. The stalks are four-cornered, hairy, and rise a foot and a half high, sending out several side branches, which are garnished with hairy linear leaves, cut into three parts; the flowers grow in short whorled spikes at the end of the stalk, having some very narrow leaves under each whorl; the tube of the flower is longer, and more equal in size than that of the former, and the middle segment of the lower lip is not so much reflexed. In other respects, the flowers are the same as those of the former.

The third sort grows naturally in Tartary; this hath a perennial root, and annual stalks which do not grow erect like the first, but spread nearer to an horizontal position; they divide into several branches, which have two large leaves opposite at each joint, and four smaller, two on each side between the larger; they are smooth, have sharp indentures on their edges, and stand erect. The flowers come out from the side of the stalks at the base of the leaves, two or three standing together on each side the stalk; their empalements are purple, and are cut into five acute segments at the top, the upper lip having three broad, and the lower two narrower. The upper lip of the flower is broad, indented at the point, and erect; the lower is trifid, but the middle segment is not so much reflexed as that of the first sort, and the flowers are of a paler blue than those. It flowers in June, and the seeds ripen in autumn.

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This name was given to this genus of plants by the learned Dr. Boerhaave, professor of botany at Leyden, in honour of Dr. Ruysch, who was professor of anatomy and botany at Amsterdam.

The plants are propagated by seed, which should be sown the latter end of March, in a bed of fresh light earth in an open exposure, and in about five or six weeks after the plants will appear, when they should be carefully cleared from weeds; and if the season should prove dry, they must be refreshed now and then with water, which will greatly promote their growth. When the plants are about two inches high, they should be carefully transplanted into a bed or border of fresh, light, undunged earth, observing to shade them from the sun until they have taken root, as also to refresh them from the sun until they are well established in this bed; after which time they will require no farther care, but to keep them constantly clear from weeds till Michaelmas, when they are to be removed into the places where they are designed to remain for good.

When the plants are first transplanted from the seed-bed into the nursery-bed, they should be planted about six inches asunder every way, which will be sufficient room for them the first season; and this will admit of the hoe to come between the plants to destroy the weeds, which is by much a better method than pulling out the weeds by hand, and is much sooner performed. For as the hoe stirs the ground between the plants, it not only cuts down the weeds which were up and visible, but also destroys all those whose seeds were sprouted, and would have soon after appeared; so that one hoeing, if well performed, and in dry weather, will more effectually destroy the weeds, than two hand-weedings would do, were they performed ever so carefully; besides, the stirring the ground is of great service to the plants.

At Michaelmas, when the plants are transplanted for good, they should be carefully taken up with balls of earth to their roots; and they must be planted in the middle of the borders in the pleasure-garden, in fresh light earth, intermixing them with other hardy plants of the same growth, where they will make a pretty appearance when they are in flower, and will continue three or four years; and in some poor stony soils I have known the roots live six or seven years, but these did not produce so large spikes of flowers, as those which were younger and more vigorous plants. Therefore, as these plants do not continue many years, it will be proper to raise a supply of young plants to succeed them, for the old plants will produce seeds plentifully, which are ripe the latter end of August or the beginning of September, when they should be gathered in dry weather, and kept in a warm dry room till the time for sowing them.

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SABINA. See JUNIPERUS.
SACCHARUM. Lin. Gen. Plant. 68.
Arundo. C. B. P. 18. The Sugar Cane.

The CHARACTERS are,

It hath no empalement, but a woolly down longer than the flower incloses it. The flower is bivalve; the valves are oblong, acute-pointed, concave and chaffy. It has three hair-like stamina the length of the valves, terminated by

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oblong summits, and an awl-shaped germen supporting two rough styles crowned by single stigmas. The germen afterward becomes an oblong acute-pointed seed, invested by the valves.

This genus of plants is ranged in the second section of Linnæus's third class, which includes the plants whose flowers have three stamina and two styles.

We have but one SPECIES of this genus at present, viz.

SACCHARUM (*Officinatum*) floribus paniculatis. Hort.

Cliff. 26. *Sugar Cane with flowers growing in panicles.*

Arundo saccharifera. C. B. P. 18. *The Sugar Cane.*

This plant grows naturally in both Indies, and is there cultivated also for its juice, which, when boiled, affords that sweet salt which is called Sugar.

The Canes were formerly cultivated in the south of France for the same purpose, but it was in small quantities only, for in sharp winters they were killed, unless they were covered, so that they had only the summer for their growth, which was too short time for their getting sufficient strength to produce Sugar enough to answer the expence, so the planting of these Canes there has been long discontinued; they were also planted in several parts of Spain before they were introduced to France, and are at present cultivated in plenty in Andalusia, from whence great quantities of Sugar are annually sent to Madrid, but there are few now planted in the other parts of Spain.

The root of this plant is jointed like those of the other sorts of Cane or Reeds, from which arise four, five, or more shoots in number, proportionable to the age or strength of the root. These rise eight or ten feet high, according to the goodness of the ground in which they grow; for in some moist rich soils there have been Canes measured, which were near twenty feet long; but these were not near so good as those of middling growth, as they abounded with juice, which had but a small quantity of the essential salt in it, so that the expence of fuel and trouble of boiling, was more than the Sugar would defray. The Canes are jointed, and these joints are more or less distant from each other, in proportion to the soil. The leaves are placed at each joint, and the base or lower part of the leaf embraces the stalk or Cane to the next joint above its insertion, before it expands; these are three or four feet long from the joint where they unfold to their point, according to the vigour of the plant; they have a deep whitish furrow, or hollowed midrib, which is broad, and prominent on the under side; the edges of the leaves are thin, and armed with small sharp teeth, which are scarce to be discerned by the naked eye, but will cut the skin of a tender hand if it be drawn along it. The flowers are produced in panicles at the top of the stalks; these are from two to three feet long, and are composed of many spikes, which are nine or ten inches long, and are again subdivided into smaller spikes; these have long down which inclose the flowers, so as to hide them from sight; afterward the germen becomes an oblong-pointed seed, which ripens in the valves of the flower.

This plant is preserved by way of curiosity in several gardens in England, but being too tender to thrive here, unless it is preserved in a warm stove, so it cannot be brought to any great perfection. I have seen some of the plants growing which were seven or eight feet high, and at the bottom as large as a common walking Cane, but they have not produced their panicles of flowers here.

It is here propagated by slips taken from the sides of the older plants; those which grow near the root and have fibres to them, will most certainly grow; so that when the shoots are produced at some distance from the ground, the earth should be raised about them, that they may put out fibres before they are separated from the mother plant. These slips should be planted in pots filled with rich kitchen-garden earth, and plunged into a moderate hot-bed of tanners bark, being careful to shade them from the sun until they have taken new root, after which they must be treated in the same way as other tender plants from the same countries. They must be constantly kept plunged in the tan-bed in the stove; and as their roots increase in size, so the plants should from time to time be shifted into larger pots; but this must be done with caution, for if they are over-potted they will not thrive: they

will require to have water frequently in warm weather, but it must not be given them in too great plenty, especially in cold weather. As the leaves of the plants decay, they should be cleared from about the stalks; for if these are left to dry upon them, it will greatly retard their growth. The stove in which this plant is placed, should be kept in winter to the same temperature of heat as for the Pine-apple, and in hot weather there should be plenty of free air admitted to the plants, otherwise they will not thrive.

I shall here subjoin some account of the method of propagating and cultivating the Sugar Cane in America, with some observations and experiments which have been made by a few curious persons in the British Islands, and shall propose some farther trials to be there made, in the culture and management of this useful plant, which are founded upon the experience I have had in the culture of some plants which are similar in their growth with the Sugar Cane.

The land which is most proper for the growth of Sugar Canes, is such as hath a sufficient depth of soil, and is not too moist and strong, but rather light and easy to work; for although strong moist ground will produce much taller and bigger Canes than the other, yet the quantity of Sugar will be much less, not near so good, and will require a greater quantity of fuel, and a longer time to boil, before the Sugar can be made; which is also the case with all fresh land, where there has not been any Canes growing before; therefore many of the most expert planters burn their land when it is first cleared for planting of Canes, to abate its fertility; but if when land is first cleared of the wood, and the roots of bad weeds, it is sown with Indigo, which such fresh ground will produce much better than the old, or such as has been long cultivated, there may be two or three crops of this taken, which will prepare the land for the Sugar Canes, without being at the trouble of burning it; but the growing of Indigo has been so little practised in the British Islands of America for many years past, as to be esteemed unworthy the notice of a Sugar planter; whereas if they would sometimes change their crops to other species, they would soon find an advantage in the growth, not only of their Canes, but also of their other crops: however, the usual practice is to continue the Canes always upon the same land as long as it will produce them, without changing the species, or allowing the ground a fallow to rest and recover itself. By this method there are some plantations so much exhausted, as that the crop of Sugar will scarce defray the expence of culture. Another thing should always be observed in the planting of fresh land with Canes, which is to allow them more room than is generally done; for as the ground is strong, so there will a greater number of shoots come out from each plant, and not having room to spread at bottom, they will draw each other up to a great height, and be full of watery juice, the sun and external air being excluded from the Canes by the multiplicity of leaves, which are both absolutely necessary to ripen and prepare the salts during the growth of the Canes.

If the ground is proper for the Sugar Canes, and they are planted at a good distance from each other, and the land is carefully managed, the same plantation may be continued above twenty years without replanting, and produce good crops the whole time; whereas in the common method, they are generally replanted in six or seven years, and in some of the poor land they are continued but two or three.

The Canes are in those warm countries propagated by cuttings or joints, of proper lengths; these are from fifteen to twenty inches long, in proportion to the nearness of their joints or eyes. These cuttings are generally taken from the tops of the Canes, just below the leaves; but if they were chosen from the lower part of the Canes, where they are less succulent and better ripened, they would not produce so luxuriant shoots, and their juice would be less crude, and contain a greater quantity of salts, which will be obtained.

tained by less boiling than those Canes in the close manner they are commonly planted: this is well known to the judicious to be the case, in most kinds of vegetables; and it is by thus carefully propagating all kinds of esculent plants, either in the choice of the best seeds or cuttings, that most of the kinds have been so greatly improved of late years.

The distance which the Canes are usually allowed in planting, is from three to four feet, row from row, and the hills are about two feet asunder in the rows; in each of these hills they plant from four to seven or eight cuttings, which is a very great fault, and is the cause of most of their blights so much complained of lately; for if all these grow, which is often the case, they rob each other of their nourishment; and if a dry season happens before they have acquired strength, they are very soon stunted in their growth, and are then attacked by insects, which spread and multiply so greatly, as to cover a whole plantation in a little time: when this happens, the Canes are seldom good after, so that it will be the better way to root them entirely up when they are so greatly injured, for they very rarely recover this disorder; for although the insects are not the cause of the disease, yet they confirm it, and cause it to spread.

Therefore, if instead of planting so many, there was but one good cutting planted in each hill, or to prevent miscarriage, two at most; and if both succeeded, the weakest were drawn out soon after they had taken root, it will be found of great service to prevent these blights; and although the number of Canes will not be near so great from the same space of ground, yet the quantity of Sugar will be full as much, and will require little more than a fourth part of fuel to boil it.

I have been assured by two of the most sensible and judicious planters of Sugar in America, that they have made some experiments of the horse-hoeing culture for their Canes, which answered much beyond their expectations; one of those gentlemen told me, he planted one acre in the middle of a large piece of Canes, in rows at five feet asunder, and the hills were two feet and a half distant, and but one cutting to each hill. The ground between the rows was from time to time stirred with the horse plough, to destroy the weeds and earth the plants; with this culture the Canes were double the size of those in the same piece, which were cultivated in the usual way; and when the Canes were cut, those which had been thus planted and managed were ground and boiled separately; the produce of Sugar was full as great as the best acre in the same piece, and the expence of boiling was little more than a sixth part of the other, and he sold the Sugar for six shillings per hundred weight more than he could get for the other.

The time for planting the Canes is always in the rainy seasons, and the sooner they are planted after the rains have begun to fall, the more time they will have to get strength before the dry weather sets in; for when they have put out good roots, and are well established in the ground, they will not be so liable to suffer by the drought, as those which have but newly taken root.

The season being come for planting, the ground should be marked out by a line, that the rows of Canes may be strait, and at equal distances; but first it will be proper to divide the piece into lands of sixty or seventy feet broad, leaving intervals between each of about fifteen feet; these will be found of great use when the Canes are cut, for roads in which the carriages may pass to carry off the Canes to the mill; for where there is not such provision made, the carriages are obliged to pass over the heads of the Canes to their no small prejudice: besides, by these intervals, the sun and air will have freer passage between the Canes, whereby they will be better ripened, and their juice will be fuller of salts; therefore when the Canes are ground, they will not require so much fuel to boil their juice. The middle of these intervals may be planted with Yams, Potatoes, or other escu-

lent plants, which may be taken off before the Canes are cut, that the passages may be clear for the carriages; but a path should be left on the sides of each land, for the more convenient riding or walking of the overseer of the plantation, to view and observe how the labour is performed.

The common method now practised in planting of the Canes is, to make a trench with a hoe, which is performed by hand; into this one negro drops the number of cuttings intended for planting, at the distance the hills are designed; these are by other negroes placed in their proper position, then the earth is drawn about the hills with a hoe, all this is performed by hand; but if the right use of ploughs was well known in those countries, the work might be much better performed, and for less than half the expence; therefore instead of making a trench with a hoe, a deep furrow is made with a plough, and the cuttings properly laid therein, the ground will be deeper stirred, and there will be more depth for placing the Canes.

If the ground is to be afterward kept clean with the horse hoe, the rows of Canes should be planted five feet asunder, that there may be room for the horse and plough to pass between them; and the distance of the hills from each other should be two feet and a half, and but one Cane should be permitted to remain in each hill. After the Canes are planted and have made some shoots, the sooner the horse plough is used the better will the Canes thrive, and the ground will be easier kept clean from weeds; for if these are torn up when they are young, they will presently die; whereas when they are suffered to grow large before they are disturbed, they are with great difficulty destroyed.

As the growth of the Canes is promoted according to the cleanness of the ground, so there cannot be too much care taken to keep the Canes perfectly clear of weeds; and the beginning of this work soon will render it less troublesome, and it may be performed at a less expence, than when it is neglected for some time. When this is performed with a plough, the earth in the interval should be thrown up to the rows of Canes, first on one side of the row, being careful not to disturb the roots of the Canes, as also not to bury their new shoots; and in the second operation, the earth should be turned over to the other side of the rows, with the same care as before. By this turning and stirring of the land, it will be rendered looser, and the earthing of the plants will greatly strengthen them; so that from each hill there will be as many shoots produced as can be well nourished, and the sun and air will have free ingress among the rows, which will be of the greatest service to the Canes.

When the Canes are from seven to ten feet high, and of a proportionable size, the skin smooth, dry, and brittle, if they are heavy, their pith gray, or inclinable to brown, the juice sweet and glutinous, they are esteemed in perfection.

The time for cutting of the Canes is usually after they have grown six months; but there should not be a fixed period for this, for in some seasons and in different soils, there will be more than a month's difference in their maturity; and those who have made the experiments of cutting their Canes before they were ripe, and letting others stand till after they were ripe, have found the Sugar made from the latter, was much finer than that of the former, though the quantity was not quite so great; however, it will always be best to let them stand till they are in perfection before they are cut, but not longer.

They have also found those Canes which are cut toward the end of the dry seasons, before the rains begin to fall, have produced better Sugar than those which are cut in the rainy seasons, when they are more replete with watery juice; and there has been much less expence of fuel to boil it, which is a material article in large plantations; therefore the better the Canes are nourished in their growth, and the more

air and fun is admitted to pass between the rows, the less expence it will be in the boiling and preparing of the Sugar.

In the boiling of Sugar, they use a mixture of wood ashes and lime, which is called temper, without which the Sugar will not granulate. The quantity of this mixture is proportioned to the quality of the ground on which the Canes grew.

SAFFRON. See CROCUS.

SAGE. See SALVIA.

SAGITTARIA. Lin. Gen. Plant. 946. Sagitta.

Dillen. Gen. 4. Ranunculus. Tourn. Inst. R. H. 287.

Arrow-head.

The CHARACTERS are,

It hath male and female flowers on the same plant; the male flowers have a permanent empalement of three oval concave leaves; they have three roundish petals which spread open, and are larger than the empalement, and many awl-shaped stamina collected in a head, terminated by erect summits. The female flowers are situated below the male; these have a three-leaved empalement, and three petals as the male, but no stamina; they have many compressed germen collected in a head, sitting upon very short styles, and have permanent acute stigmas. The germen afterward become oblong compressed seeds having longitudinal borders, and are collected in globular heads.

This genus of plants is ranged in the eighth section of Linnæus's twenty-first class, which includes those plants which have male and female flowers on the same plant, whose male flowers have many stamina.

The SPECIES are,

1. SAGITTARIA (*Sagittifolia*) foliis omnibus sagittatis acutis petiolis longissimis. Arrow-head with all the leaves arrow-pointed, and long foot-stalks. Sagitta aquatica major. C. B. P. The greater Arrow-head.

2. SAGITTARIA (*Minor*) foliis sagittatis spatulisque, petiolis longioribus. Arrow-head with arrow-pointed and spatulate-shaped leaves, having longer foot-stalks. Sagitta aquatica foliis variis. Lœfl. Pruss. 234. Water Arrow-head with variable leaves.

The first sort grows naturally in standing waters in most parts of England; the root is composed of many strong fibres, which strike deep into the mud; the foot-stalks of the leaves are in length proportionable to the depth of the water in which they grow, so they are sometimes almost a yard long; they are round, thick, and fungous; the leaves which float upon the water are shaped like the point of an arrow, the two ears at their base spreading wide asunder, and are very sharp-pointed. The flowers are produced upon long stalks which rise above the leaves, and stand in whorls round them at the joints; they have each three broad white petals which spread open, and in the middle is a cluster of stamina with purple summits. It flowers in July. The flowers are succeeded by rough heads, containing many small seeds.

The second sort grows plentifully in standing waters near Paris, but has not been found wild in England. This never grows so large as the former; the leaves vary greatly, some of them are oblong, round-pointed, and shaped like a spatula; others are arrow-pointed, but these have their points less acute than those of the former, and the flowers are smaller, in which it differs from the former; and as all the plants where this grows retain their difference, so it may be supposed a different species.

There is also a third sort mentioned by Dr. Plukenet, under the title of Sagitta aquatica omnium minima, or the least Arrow-head. This grows plentifully on the borders of the Thames about Lambeth, and also at Chelsea; the foot-stalks of the leaves of this are very short, the leaves are much less, and the stalks which support the flowers are also very short; but these differences may be occasioned by the situation of their growth, for it is always found growing in the mud, which the water ebbs from every tide, so it is only covered in high water, which may stint the growth of the plants, and give them this appearance.

SALICARIA. See LYTHRUM.

SALICORNIA. Tourn. Cor. App. 51. tab. 485.

Lin. Gen. Plant. 10. Jointed Glasswort, or Saltwort.

The CHARACTERS are,

The flower hath a rugged, swelling, four-cornered empalement, which is permanent. It has no petal, and but one stamina the length of the empalement, crowned by an oblong twin summit, and an oblong oval germen supporting a single style, crowned by a bifid stigma. The germen afterward becomes a single seed, inclosed in the swelling empalement.

This genus of plants Dr. Linnæus places in the first section of his first class, which contains those plants whose flowers have but one stamina and one style.

The SPECIES are,

1. SALICORNIA (*Fruticosa*) articulis apice crassioribus obtusis. Lin. Mat. Med. 8. Jointed Glasswort with thick obtuse points. Kali geniculatum. Ger. Emac. 535. Common jointed Glasswort.

2. SALICORNIA (*Perenne*) articulis apice acutioribus, caule fruticoso ramoso. Glasswort with acute points to the joints, and a shrubby branching stalk. Kali geniculatum perenne fruticosius procumbens. Raii Syn. Ed. 2. p. 67. Trailing, shrubby, perennial, jointed Glasswort.

The first sort grows plentifully in most of the salt-marshes which are overflowed by the tides, in many parts of England. This is a trailing plant, with thick, succulent, jointed stalks, which trail upon the ground, and divide into several branches. The flowers are produced at the ends of the joints toward the extremity of the branches, which are small, and scarce discernible by the naked eye. It flowers the latter end of July, and the seeds ripen in autumn.

The second sort grows naturally in Sheepey Island; this hath a shrubby branching stalk about six inches long; the points of the articulations are acute, the stalks branch from the bottom, and form a kind of pyramid; they are perennial, and produce their flowers in the same manner as the former.

The inhabitants near the sea-coast where these plants grow, cut them up toward the latter end of summer, when they are fully grown; and after having dried them in the sun, they burn them for their ashes, which are used in making of glass and soap. These herbs are, by the country people, called Kelp, and are promiscuously gathered for use.

From the ashes of these plants is extracted the salt, called sal kali, or alkali, which is much used by the chemists.

The manner of gathering and burning of these herbs is mentioned under the article of SALSOLA, so I shall not repeat it in this place.

In some parts of England these herbs are gathered and pickled for Samphire, though that is a very different plant from either of these.

SALIX. Tourn. Inst. R. H. 590. tab. 364. Lin. Gen. Plant. 976. [takes its name from salio, to leap or dance, because of its quick growth.] The Sallow, or Willow-tree; in French, *Saule*.

The CHARACTERS are,

It hath male and female flowers upon separate plants; the male flowers are disposed in one common, oblong, imbricated katkin. The scales have each one oblong spreading flower, which has no petal, but a cylindrical nectarious gland in the center. It has two slender erect stamina, terminated by twin summits having four cells. The female flowers are disposed in katkins as the male; these have neither petals or stamina, but an oval narrowed germen, scarce distinguishable from the style, crowned by two bifid erect stigmas. The germen afterward becomes an oval awl-shaped capsule with one cell, opening with two valves, containing many small oval seeds, crowned with hairy down.

This genus of plants is ranged in the second section of Linnæus's twenty-second class, which contains those plants which have male and female flowers on separate plants, whose male flowers have two stamina. There are several species of this genus which grow naturally in the northern parts of Europe, of little or

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no use, being low creeping shrubs, many of them seldom rising a foot high, so are never cultivated, therefore I shall pass them over, and only enumerate those which are planted for use.

The SPECIES are,

1. SALIX (*Alba*) foliis lanceolatis acuminatis ferratis utrinque pubescentibus, ferraturis infimis glandulosis. Hort. Cliff. 473. *Willow with spear-shaped, acute-pointed, sawed leaves, which are downy on both sides, and glands below the saws.* Salix vulgaris alba, arborescens. C. B. P. 453. *Common white Tree Willow.*
2. SALIX (*Triandra*) foliis ferratis glabris, floribus triandris. Lin. Sp. Plant. 1015. *Willow with smooth sawed leaves, and flowers having three stamina.* Salix folio auriculato splendente flexilis. Raii Hist. 1420. *Willow with lucid eared leaves and flexible branches.*
3. SALIX (*Pentandra*) foliis ferratis glabris, flosculis pentandris. Hort. Cliff. 454. *Willow with smooth sawed leaves, and flowers having five stamina.* Salix folio laureo seu lato glabro odorato. Raii Hist. 1420. *Willow with a Bay leaf, or broad-leaved, smooth, sweet Willow.*
4. SALIX (*Vitellina*) foliis ferratis ovatis acutis glabris, ferraturis cartilagineis, petiolis calloso punctatis. Hort. Upsal. 295. *Willow with smooth, oval, acute, sawed leaves, having cartilaginous indentures, and foot-stalks with callous punctures.* Salix fativa lutea, folio crenato. C. B. P. 473. *Yellow cultivated Willow with a crenated leaf.*
5. SALIX (*Amygdalina*) foliis ferratis glabris lanceolatis petiolatis, stipulis trapeziformibus. Flor. Leyd. Prod. 83. *Willow with smooth, spear-shaped, sawed leaves having foot-stalks, and trapezium-shaped stipulæ.* Salix folio amygdalino, utrinque virente aurito. C. B. P. 43. *Almond-leaved Willow with leaves which are eared, and green on both sides.*
6. SALIX (*Fragilis*) foliis ferratis glabris ovato-lanceolatis, petiolis dentato-glandulosis. Flor. Lapp. 349. *Willow with oval, spear-shaped, smooth, sawed leaves, and indented glandules to the foot-stalk.* Salix folio longo latoque splendente fragilis. Raii Syn. 3. p. 448. *The Crack Willow.*
7. SALIX (*Purpurea*) foliis ferratis glabris lanceolatis, inferioribus oppositis. H. Scan. 252. *Willow with smooth, spear-shaped, sawed leaves, the lower of which grow opposite.* Salix folio longo subluteo non auriculata, viminibus rubris. Raii Syn. *The long-leaved red Willow.*
8. SALIX (*Viminalis*) foliis subintegerrimis lanceolato-linearibus longissimis acutis subtus sericeis, ramis virgatis. Flor. Suec. 813. *Willow with the longest, linear, spear-shaped, acute leaves, which are almost entire, and silky on their under side, and rod-like branches.* Salix foliis angustis & longissimis crispis, subtus albicantibus. J. B. I. p. 212. *Willow with the longest, narrow, curled leaves, which are white on their under side.*
9. SALIX (*Auriculata*) foliis ferratis glabris lanceolatis, omnibus alternis. *Willow with smooth, spear-shaped, sawed leaves, all growing alternate.* Salix folio amygdalino utrinque aurito, corticem abiciens. Raii Syn. 3. p. 448. *Almond-leaved Willow which is eared on both sides, and casts its bark.*
10. SALIX (*Rubra*) foliis integris, glabris lineari lanceolatis acutis. Hudf. Flor. Angl. 364. *Willow with linear, spear-shaped, smooth leaves.* Salix minimè fragilis, foliis longissimis, utrinque viridibus non ferratis. D. Sherard. Raii Syn. 2. p. 293. *The least brittle Willow, with very long leaves which are green on both sides, and not sawed.*
11. SALIX (*Babylonica*) foliis ferratis glabris lineari-lanceolatis, ramis pendulis. Hort. Cliff. 454. *Willow with smooth, sawed, linear, spear-shaped leaves, and hanging branches.* Salix Orientalis, flagellis deorsum pulchrè pendentibus. Tourn. Cor. 41. *The Weeping Willow.*
12. SALIX (*Helix*) foliis ferratis glabris lanceolato-linearibus, superioribus oppositis obliquis. Flor. Leyd. Prod. 83. *Willow with linear, spear-shaped, smooth, sawed leaves, the upper of which are placed obliquely op-*

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posite. Salix humilior foliis angustis subcæruleis ex adverso binis. Raii Syn. 2. p. 297. *The yellow Dwarf Willow.*

13. SALIX (*Caprea*) foliis ovatis rugosis, subtus tomentosis undatis supernè denticulatis. Flor. Leyd. Prod. 83. *Willow with oval rough leaves which are waved, woolly on their under side, and indented towards the top.* Salix latifolia rotunda. C. B. P. 474. *Broad round-leaved Willow, or Sallow.*
14. SALIX (*Acuminata*) foliis oblongo-ovatis acuminatis rugosis subtus tomentosis. *Willow with oblong, oval, acute-pointed, rough leaves, which are woolly on their under side.* Salix folio ex rotunditate acuminato. C. B. P. 474. *Willow with a rounded, acute-pointed leaf, or common Sallow.*

The first sort is the common white Willow, which is frequently found growing on the sides of rivers and ditches in many parts of England. It grows to a large size, if the branches are not lopped off; the shoots are covered with a smooth, pale, green bark; the leaves are spear-shaped, between three and four inches long, and one broad in the middle, drawing to a point at each end; they are very white on their under side, and their upper side is covered with short, white, woolly hairs, though not so closely as the under; the katkins are short and pretty thick. The wood of this sort is very white, and polishes smooth.

The second sort grows to be a large tree, the young branches are covered with a grayish bark; the leaves are smooth, of a lucid green, ending in acute points; they are eared at their base, and sawed on their edges, and are green on both sides; the branches grow pretty erect and are flexible, so this is frequently planted in Osier-grounds for the basket-makers. The katkins of this are long, narrow, and the scales open, and are acute-pointed.

The third sort hath thick strong shoots, covered with a dark green bark; the leaves are broad, rounded at both ends; they are very smooth, sawed on their edges, and when rubbed have a grateful odour. It is sometimes called the Bay-leaved Willow, and at others the Sweet Willow; it grows quick, and is a tree of middling size; the branches are brittle, so are not proper for many purposes.

The fourth sort has slender tough shoots, which are of a yellow colour; the leaves are oval, acute-pointed, smooth, and sawed on their edges; the saws are cartilaginous, and the foot-stalks of the leaves have callous punctures. This is very pliable, so is much planted in the Osier-grounds for the basket-makers, but it never grows to a large size.

The fifth sort grows to a pretty large size; the shoots are erect, they are covered with a light green bark; the leaves are spear-shaped, about two inches and a half long, and three quarters of an inch broad in the middle, drawing to a point at both ends; they are of a lucid green on both sides, sawed on their edges, standing upon short foot-stalks; they have stipulæ in form of a trapezium, at the base of the foot-stalk. The twigs of this sort are flexible, and fit for the use of basket-makers.

The sixth sort grows to a middling size; the shoots of this are very brittle, so are unfit for the basket-makers, and are covered with a brownish bark; the leaves are near five inches long and one broad; they are of a lucid green on both sides, and are sawed on their edges; the katkins are long and slender, and the scales are pretty long, acute-pointed, and stand open. It is commonly called Crack Willow, from the branches being very brittle.

The seventh sort is a tree of middling size; the shoots are very pliable, and fit for the basket-makers, so is much planted in the Osier-grounds; they are of a reddish colour; the leaves are spear-shaped, smooth, and sawed on their edges; those on the lower part of the branches are placed opposite, but on the upper they are alternate, and are of a yellowish green.

The eighth sort makes very long shoots, but the tree seldom grows to a large size; the leaves are very long and entire, and are set close upon the branches; they are

are of a dark green on their upper side, but are very woolly and white on their under, ending in acute points, and stand upon very short foot-stalks: the young branches of this sort are woolly, and their buds are very turgid. This is pretty much planted in the Osier-grounds, for the use of basket-makers.

The ninth sort is a tree of middling growth; it casts its bark annually; the shoots are brittle, they have a yellowish bark; the leaves are spear-shaped, and sawed on their edges; they are eared on both sides at their base, and are all placed alternate, being of a light green on both sides. This sort is not very commonly cultivated, the twigs being too brittle.

The tenth sort hath very pliant branches, so is much planted in the Osier-grounds. The leaves of this are very long; they are spear-shaped and entire, and are green on both sides. It grows to a middling size, if planted in moist land.

The eleventh sort grows naturally in the Levant, but has been several years cultivated in the English gardens. This will grow to a middling size; the branches are long, slender, and hang down on every side, so form natural arches; the leaves are narrow, spear-shaped, smooth, and sawed on their edges. It is well known in the gardens, by the title of Weeping Willow.

The twelfth sort is a tree of lower growth; the branches of this are erect; the leaves are smooth, narrow, spear-shaped, and sawed on their edges; they are of a dark or bluish green, and toward the upper part of the branches are placed opposite. It is found by the side of ditches in many parts of England.

The thirteenth sort grows naturally upon dry land, and on high situations, but rarely is seen of a large size; the bark is of a gray dark colour, and smooth; the branches are brittle, so are unfit for basket-makers, but it is frequently cultivated in hedges, and for fuel in many parts of England: it is called Mountain Osier. The leaves are oval, rough, and woolly, and are indented toward the top; they are about an inch and a half long, and one inch broad, rounded at both ends, and have short foot-stalks. There is a variety of this in the gardens with variegated leaves.

The fourteenth sort is the common Sallow; this differs from the last, in having longer leaves which end in acute points; they are woolly on their under side, and sit close to the branches; they are not distinguished by the farmers, who cultivate them equally.

There are some other sorts of Willows which are planted in the Osier-grounds, and are distinguished by the basket-makers and dealers in them, under titles which they have applied to them, which are little known to others; these are annually cut down, and always kept low, but when they are not cut down, and have room to grow, will rise to a considerable height, and some of them will become large trees; so that they may be planted for the same purposes as the first sort, and will make a variety when intermixed with it, though they are commonly cultivated for their twigs, which produce good profit to the owner of the land.

All the sorts of Willows may be easily propagated by planting cuttings or sets, either in the spring or autumn, (but the spring is the surest season) which readily take root, and are of a quick growth. Those sorts which grow to be large trees, and are cultivated for their timber, are generally planted from sets, which are about seven or eight feet long; these are sharpened at their larger end, and thrust into the ground by the sides of ditches and banks, where the ground is moist; in which places they make a considerable progress, and are a great improvement to such estates, because their tops will be fit to lop every sixth or seventh year. This is the usual method now practised in most parts of England, where the trees are cultivated, as they are generally intended for present profit; but if they are designed for large trees, or are cultivated for their wood, they should be planted in a different manner; for those which are

planted from sets of seven or eight feet long always send out a number of branches toward the top, which spread, and form large heads fit for lopping, but their principal stem never advances in height; therefore, where regard is paid to that, they should be propagated by short young branches, which should be put almost their whole length in the ground, leaving only two, or at most but three buds out of the ground; and when these have made one year's shoot, they should be all cut off, except one of the strongest and best situated, which must be trained up to a stem, and treated in the same way as timber trees. If these are planted with such design, the rows should be eight feet asunder, and the sets four feet distance in the rows; by planting them so close, they will naturally draw each other upward, and, when they are grown so large, as to cover the ground and meet, they should be gradually thinned, so as at the last to leave the rows about twelve feet asunder, and the plants in the rows eight. If they are so treated, the trees will grow to a large size, and rise with upright stems to the height of forty feet or more.

When these cuttings are planted, it is usual to sharpen those ends to a point which are put into the ground, for the better thrusting of them in; but the best way is to cut them horizontally just below the bud or eye, and to make holes with an iron instrument in the ground where each cutting is to be planted, and when they are put in, the ground should be pressed close about the cuttings with the heel to settle it, and prevent the air from penetrating deep into the ground. The after care must be to keep them clear from weeds the two first seasons, by which time they will have acquired so much strength, as to over-power and keep down the weeds; they will also require some trimming in winter to take off any lateral shoots, which, if suffered to grow, would retard their upright progress.

There are great tracts of land in England fit for this purpose, which at present produce little to the owners, and might, by planting of these trees, turn to as good account as the best Corn land. The larger wood, if found, is commonly sold for making wooden heels for shoes; as also to turners for many kinds of light ware.

The Sallows are commonly planted in cuttings made from strong shoots of the former year, about three feet long; these are commonly thrust down two feet deep into the ground, and are one foot above it. The cuttings should be placed about five feet row from row, and two feet asunder in the rows, observing always to plant the rows the sloping way of the ground (especially if the tides overflow the place;) because, if the rows are placed the contrary ways, all the filth and weeds will be detained by the sets, which will choak them up.

The best season for planting these cuttings in the Osier-grounds is in February, for if they are planted sooner, they are apt to peel, if it proves hard frost, which greatly injures them. These plants are always cut every year, and, if the soil be good, they will produce a great crop, so that the yearly produce of one acre has been often sold for fifteen pounds, but ten pounds is a common price, which is much better than Corn land; so that it is great pity these plants are not more cultivated, especially upon moist boggy soils, upon which few other things will thrive.

S A L S O L A. Lin. Gen. Plant. 275. Kali. Tourn. Inst. R. H. 247. tab. 128. Glasswort; in French, *Soude*.

The CHARACTERS are,

The empalement of the flower is permanent, and composed of five oval obtuse leaves; the flower has no petals, but hath five short stamina which are inserted in the divisions of the petals; it hath a globular germen, with a short two-pointed style, crowned by recurved stigmas. The germen afterward becomes a globular capsule with one cell, wrapped up in the empalement, inclosing one large seed.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. SALSOLA (*Kali*) herbacea decumbens, foliis subulatis spinosis, calycibus marginatis axillaribus. Lin. Sp. Plant. 222. *Herbaceous trailing Salsola with awl-shaped prickly leaves, and empalements proceeding from the sides of the stalks.* Kali spinosum foliis crassioribus & brevioribus. Tragum. Matth. 1035. *Prickly Glasswort with shorter and thicker leaves.*
2. SALSOLA (*Tragus*) herbacea erecta, foliis subulatis spinosis lævibus, calycibus ovatis. *Herbaceous Salsola with awl-shaped prickly leaves, and oval empalements.* Kali spinosum, foliis longioribus & angustioribus. Tourn. Inst. R. H. 247. *Prickly Glasswort with longer and narrower leaves.*
3. SALSOLA (*Soda*) herbacea, foliis inermibus. Guett. Stamp. 426. *Herbaceous Salsola with smooth leaves.* Kali majus cochleato femine. C. B. P. 287. *Greater Glasswort with a cochleated leaf.*
4. SALSOLA (*Vermiculata*) frutescens, foliis ovatis acutis carnosius. Lin. Sp. Plant. 223. *Skrubby Salsola with oval, fleshy, acute-pointed leaves.* Kali fruticosum Hispanicum, tamarisci folio. Tourn. Inst. R. H. 247. *Skrubby Spanish Glasswort with a Tamarisk leaf.*
5. SALSOLA (*Rosacea*) herbacea, foliis subulatis mucronatis, calycibus explanatis. Lin. Sp. Plant. 222. *Herbaceous Salsola with pointed awl-shaped leaves, and spreading empalements.* Kali humile, alis purpureis florem rosaceum mentientibus. Buxb. Cent. 1. p. 9. *Dwarf Glasswort, having purple wings which resemble a Rose flower.*

The first sort grow snaturally in the salt-marshes in divers parts of England; it is an annual plant, which rises about five or six inches high, sending out many side branches from the bottom, which spread on every side; these are garnished with short awl-shaped leaves which are fleshy, and terminate in acute spines. The flowers are produced from the sides of the branches, to which they fit close, and are encompassed by short prickly leaves; they are small, and of an herbaceous colour. The seeds are wrapped up in the empalement of the flower, and ripen in autumn, soon after which the plants decay.

The second sort grows naturally on the sandy shores of the south of France, Spain, and Italy; this is also an annual plant, which sends out many diffused stalks a foot and a half long, which are garnished with linear leaves an inch long, ending with sharp spines. The flowers come out from the side of the stalks in the same manner as those of the former; their empalements are blunt, and not so closely encompassed with leaves as those of the other.

The third sort rises with herbaceous stalks near three feet high, sending out hoary branches their whole length, which at bottom spread out wide, but toward the top they are short. The leaves on the principal stalk, and those on the lower part of the branches, are long, slender, and have no spines; those on the upper part of the stalk and branches are slender, short, and crooked. At the base of the leaves are produced the flowers, which are small and hardly perceptible; the empalement of the flower afterward encompasses the capsule, which contains one cochleated seed. This sort in warm countries produces its flowers in June, and the seeds ripen in August; but in this country the plants scarce ever flower, unless the summer is very warm. This plant is cultivated about Montpellier in salt-marshes, in order to make sal alkali.

The fourth sort grows naturally in Spain; this hath shrubby perennial stalks which rise three or four feet high, sending out many side branches, which are garnished with fleshy, oval, acute-pointed leaves, coming out in clusters from the side of the branches; they are hoary, and have no stiff prickles. The flowers are produced from between the leaves toward the ends of the branches; they are so small as scarce to be discerned, unless they are closely viewed. The seeds are like those of the other kinds.

The fifth sort grows naturally in Tartary; this is an

annual plant whose stalks are herbaceous, and seldom rise more than five or six inches high. The leaves are awl-shaped, ending in acute points; the flowers are small, and of a Rose colour, but soon fade; the seeds are like those of the other sorts.

All the sorts of Glasswort are sometimes promiscuously used for making the sal alkali, but it is the third sort which is esteemed best for this purpose. The manner of making it is as follows: having dug a trench near the sea, they lay laths across it, on which they lay the herb in heaps, and having made a fire below, the liquor which runs out of the herbs drops to the bottom, which at length thickening becomes sal alkali, which is partly of a black, and partly of an Ash colour, very sharp and corrosive, and of a saltish taste. This, when thoroughly hardened, becomes like a stone, and is there called soude or sode. It is transported from thence to other countries for making of glass.

SALT is a fossil body, fusible by fire, and congealable again, in the cold, into brittle glebes or crystals; soluble withal in water, so as to disappear therein; never malleable, and having something in it, which, to the organ of taste, affords a sensation of acrimony and sharpness.

Dr. Grew supposes, That the chief governing principle in the juices of plants is the saline or Salt, which saline principle is to be understood as a general term. The vegetable Salts seem to be four, viz. the nitrous, the acid, the alkaline, and the marine.

The nitrous Salts seem by nature to be assigned chiefly to the growth of plants, and the other three Salts are exhibited by the several ways of resolving the principles of a plant.

Salt is accounted a good dressing for cold lands, because the nature of it is such, that the drier and hotter it is kept, the more it keeps its own body, and does not turn to water: but when it stands in a cold moist place, in a little time it dissolves to water, and, when turned to water, is fit for the nourishment and feeding of plants, especially annuals.

The reason why Salt, viz. Salt water, is accounted a feeder of plants, is, that it has been often observed that Salt falling on a board, &c. will be long drying; and, if it has been dried by heat, dews, or rain, will make it moist again, and then it steams forth, and that is it which nourishes all plants; but, if it be upon a hot and dry ground, late in the spring, and dry weather comes, it does not, nor can yield its steam or fume.

Pigeons dung is by many esteemed good for cold lands, because it is hotter and saltier than any other dung, it being natural to pigeons to eat Salt, for they fly to the sea side early on mornings to pick up the Salt, which the heat of the sun makes by drying up the Salt water, and leaves upon the sand.

The Rev. Dr. Hales, in his excellent Treatise of Vegetation, observes, that plants are of a less durable texture, as they abound with a greater proportion of Salt and water, which is not so strongly attracted as sulphur and air, so they are the less able to endure the cold; and, as plants are observed to have a greater proportion of Salt and water in them in the spring than in autumn, they are more easily injured by cold in the spring, than in a more advanced age, when their quantity of oil is increased, with their greater maturity.

Whence we find, that nature's chief business in bringing the parts of a vegetable, especially its fruit and seed, to a maturity, is to combine together, in a due proportion, the more active and noble principles of sulphur and air, that chiefly constitute oil, which in its most refined state is never found without some degree of earth and Salt in it.

Common Salt, if it could be obtained at a reasonable rate, would be an excellent dressing for most lands, but the exorbitant duty which is laid upon it, renders it too expensive to be used for this purpose, so that it is needless to mention its usefulness.

SALVIA.

SALVIA. Tourn. Inst. R. H. 180. tab. 83. Lin. Gen. Plant. 36. [So called from *salvus*, or *salus vitæ*, i. e. the health of life.] Sage; in French, *Sauge*.

The CHARACTERS are,

The empalement of the flower is tubulous, of one leaf, striated, and large at the mouth, where it is cut into four parts. The flower is of the lip kind, of one petal; the lower part is tubulous, the upper is large and compressed; the upper lip is concave, incurved, and indented at the point; the lower lip is broad and trifid, the middle segment being large, roundish, and indented. It has two short stamina which stand transverse to the lip, and are fixed in the middle to the tube, to whose tops are fixed glands, upon the upper side of which sit the summits; it has a four-pointed germen supporting a long slender style, situated between the stamina, crowned by a bifid stigma. The germen afterward becomes four roundish seeds which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's second class, which includes those plants whose flowers have two stamina and one style. To this genus he has added the *Horminum* and *Sclarea* of Tournefort, which, according to his system, may be joined together; but as there is a difference in the lips of the flowers, I have chosen to keep the three genera distinct, because they have always been known by their different titles both in the gardens and shops.

The SPECIES are,

1. SALVIA (*Officinalis*) foliis lanceolatis-ovatis integris crenulatis, floribus verticillato-spicatis. Sage with spear-shaped, oval, entire leaves, which are slightly crenated on their edges, and flowers growing in whorled spikes. *Salvia major*. C. B. P. The greater Sage.
2. SALVIA (*Tomentosa*) foliis infimis cordatis, summis oblongo-ovatis ferratis tomentosis, floribus verticillato-spicatis. Sage with heart-shaped lower leaves, the upper are oblong, oval, sawed, and woolly, and flowers growing in whorled spikes. *Salvia latifolia* ferrata. C. B. P. 237. Broad-leaved sawed Sage.
3. SALVIA (*Auriculata*) foliis lanceolatis sæpius articulatis subtus tomentosis, floribus spicato-verticillatis, calycibus ventricosis. Sage with spear-shaped leaves which are frequently eared, and woolly on their under side, flowers growing in whorled spikes, and bellied empalements. *Salvia minor aurita* & non aurita. C. B. P. 237. Smaller Sage with leaves earless and eared, commonly called Sage of Virtue.
4. SALVIA (*Hispanica*) foliis lineari-lanceolatis integerrimis tomentosis, floribus spicatis calycibus brevissimis ventricosis acutis. Sage with linear, spear-shaped, woolly, entire leaves, spiked flowers, and the shortest bellied empalements ending in acute points. *Salvia Hispanica Lavendulæ folio*. Tourn. Inst. R. H. 181. Spanish Sage with a Lavender leaf.
5. SALVIA (*Fruticosa*) foliis infimis pinnatis, summis ternatis rugosis, floribus spicatis, caule fruticoso tomentosa. Sage with winged lower leaves, the upper ones trifoliate and rough, flowers growing in spikes, and a shrubby woolly stalk. *Salvia orientalis Absinthium redolens*, foliis pinnatis, flore carneo elatior. Sherard. Act. Phil. Lond. 383. Taller Eastern Sage with a Wormwood smell, winged leaves, and a flesh-coloured flower.
6. SALVIA (*Pomifera*) foliis lanceolato-ovatis integris crenulatis, floribus spicatis, calycibus obtusis. Hort. Cliff. 12. Sage with spear-shaped, oval, entire leaves which are slightly crenated, spiked flowers, and blunt empalements. *Salvia Cretica frutescens pomifera*, foliis longioribus incanis & crispis. Tourn. Cor. 10. Shrubby Apple-bearing Sage of Crete, with longer, hoary, and curled leaves.
7. SALVIA (*Pinnata*) foliis compositis pinnatis. Hort. Cliff. 13. Sage with compound winged leaves. *Salvia orientalis, latifolia, hirsutissima, viscosa, pinnata*, flore & calyce purpureis inodora. Boerh. Ind. alt. 1. p. 167. Eastern, broad-leaved, hairy, unfavoury Sage, with clammy winged leaves, and the flowers and empalements purple.
8. SALVIA (*Orientalis*) foliis infimis pinnatis, summis simplicibus crenatis, floribus verticillatis caulibus procumbentibus hirsutissimis. Sage with winged lower

leaves, the upper ones single and crenated, flowers growing in whorls, and the most hairy trailing stalks. *Salvia orientalis, latifolia, Absinthium redolens*, flore carneo magno. Boerh. Ind. alt. 1. p. 167. Eastern, broad-leaved, Wormwood Sage, with a large flesh-coloured flower.

9. SALVIA (*Dominica*) foliis cordatis obtusis crenatis subtomentosis, corollis calyce angustioribus. Lin. Sp. Plant. 25. Sage with heart-shaped, blunt, crenated leaves which are somewhat woolly, and the petals narrower than the empalement. *Velezia* Monier. The *Velezia* of Dr. Monier.

10. SALVIA (*Aurea*) foliis subrotundis integerrimis, basi truncatis dentatis. Hort. Cliff. 13. Sage with roundish entire leaves which are torn, and indented at their base. *Salvia Africana frutescens*, folio subrotundo glauco, flore magno aureo. Hort. Amst. 2. p. 183. Shrubby African Sage with a roundish gray leaf, and a large golden flower.

11. SALVIA (*Africana*) foliis subrotundis ferratis, basi truncatis dentatis. Hort. Cliff. 13. Sage with roundish sawed leaves which are torn, and indented at their base. *Salvia Africana frutescens*, folio scorodonix, flore violaceo. Hort. Amst. 2. p. 18. Shrubby African Sage, with a Wood Sage leaf and a Violet flower.

12. SALVIA (*Integerrima*) foliis oblongo-ovatis integerrimis, calycibus patulis coloratis. Tab. 225. fig. 2. Sage with oblong, oval, entire leaves, and spreading coloured empalements.

The first sort is the common large Sage which is cultivated in gardens, of which there are the following varieties: 1. The common green Sage. 2. The Wormwood Sage. 3. The green Sage with a variegated leaf. 4. The red Sage. 5. The red Sage with a variegated leaf; these are accidental variations, and therefore are not enumerated as species. The common Sage grows naturally in the southern parts of Europe, but is here cultivated in gardens for use; but that variety with red or blackish leaves is the most common in the English gardens, and the Wormwood Sage is in greater plenty here than the common green-leaved Sage, which is but in few gardens. The common Sage is so well known as to require no description.

The second sort is generally titled balsamic Sage by the gardeners. The stalks of this do not grow so upright as those of the common Sage; they are very hairy, and divide into several branches, which are garnished with broad, heart-shaped, woolly leaves, standing upon long foot-stalks; they are sawed on their edges, and their upper surfaces are rough; the leaves, which are upon the flower-stalks, are oblong and oval, standing upon shorter foot-stalks, and are very slightly sawed on their edges; the flowers grow in whorled spikes toward the top of the branches; the whorls are pretty far distant, and but few flowers in each; they are of a pale blue, and about the size of those of the common sort. It flowers in June, and in good seasons the seeds ripen in autumn. This Sage is preferred to all the others for making tea.

The third sort is the common Sage of Virtue, which is also well known in the gardens and markets. The leaves of this are narrower than those of the common sort; they are hoary, and some of them are indented on their edges toward the base, which indentures have the appearance of ears. The spikes of flowers are longer than those of the two former sorts, and the whorls are generally naked, having no leaves between them. The flowers are smaller, and of a deeper blue than those of the common red Sage.

The fourth sort grows naturally in Spain. The leaves of this are very narrow and entire, standing in clusters on the side of the stalks; they are very hoary, and the branches are covered with a hoary down; the leaves on the upper part of the stalk are narrower than those of Rosemary; the flowers grow in closer spikes than either of the former, and are of a light blue colour.

The fifth sort grows naturally about Smyrna, from whence the late Dr. William Sherard sent the seeds, which succeeded in the Chelsea Garden. This rises with a shrubby stalk four or five feet high, and divides into

into several branches which grow erect. The leaves on the lower branches are winged, being composed of two or three pair of small lobes, terminated by one large one. Those which grow on the flowering branches are trifoliate, the two inner lobes being small, and the outer one is large, ending in a point; they have the flavour of Wormwood, and their upper surface is rough. The flowers grow in long spikes at the end of the branches; the whorls are pretty close to each other, and have no leaves between them; the flowers are large, and of a flesh colour. This flowers in July, but never produces good seeds in England.

The sixth sort grows naturally in Crete; this hath a shrubby stalk which rises four or five feet high, dividing into several branches, which are garnished with spear-shaped, oval, entire, woolly leaves, slightly crenated on their edges. The flowers grow in spikes at the end of the branches; they are of a pale blue colour, and have obtuse empalements. The branches of this Sage have often punctures made in them by insects, at which places grow large protuberances as big as Apples, in the same manner as the galls upon the Oak, and the rough balls on the Briar.

The seventh sort grows naturally in the Levant; this is an annual or biennial plant, with trailing stalks. The leaves on the lower part of the stalks are composed of two or three small pair of lobes, terminated by one large one; those farther up are trifoliate, the outer lobe being four times the size of the side ones. The flowers grow in whorls round the stalks; they are large, and of a deep blue colour, as are also their empalements. This flowers in July, and the seeds ripen in autumn, soon after which the plants generally decay.

The eighth sort grows naturally about Smyrna, where the late Dr. Sherard gathered the seeds; this is a perennial plant with trailing stalks, which grow near two feet long, garnished toward the bottom with leaves composed of two pair of small lobes terminated by a large one, but those toward the top are single and stand opposite. The flowers are produced in whorls round the stalks; they are large, and of a flesh colour, but are not succeeded by seeds here.

The ninth sort grows naturally at St. Domingo; this is an annual plant, which rises with an erect, four-cornered, branching stalk three or four feet high, garnished with large heart-shaped leaves of a bright green colour, which are obtusely crenated on their edges, having several veins on their lower side, which diverge from the midrib to the sides. Their foot-stalks are long and slender; the flowers are produced in close spikes at the end of the branches; they are of a fine blue colour, and their tubes are narrower than the empalement. It flowers in July, and the seeds ripen in autumn.

The tenth sort grows naturally at the Cape of Good Hope; this rises with a shrubby stalk seven or eight feet high, covered with a light-coloured bark, sending out branches the whole length, which grow almost horizontally; they are garnished with roundish gray leaves which are entire, and seem torn at their base, where they are also indented. The flowers are produced in thick short spikes at the end of the branches; they are very large, and of a dark gold colour; they appear in May and June, but are not succeeded by seeds in England.

The eleventh sort grows naturally at the Cape of Good Hope; this rises with a shrubby stalk four or five feet high, dividing into branches, which are garnished with oval sawed leaves of a gray colour, and have one or two indentures at their base that seem torn. The flowers come out in whorls toward the end of the branches; they are of a fine blue colour, and larger than those of the common Sage; these appear in succession most of the summer months, and those which come early, are often succeeded by seeds which ripen in autumn.

The twelfth sort has been lately raised in the Dutch gardens, from seeds which were brought from the Cape of Good Hope. It has great resemblance to the for-

mer, but the branches are stronger and grow more erect; the leaves are longer and not so broad; their edges are not sawed; the flowers grow in long loose spikes at the end of the branches; they are larger, and of a paler blue than the other, and their empalements are broader, spread wider, and are of a pale blue colour, in which consists their difference.

All the sorts of Sage may be propagated by seeds if they can be procured; but as some of them do not perfect their seeds in England, and most of the sorts, but especially the common kinds for use, are easily propagated by slips, it is not worth while to raise them from seeds. The slips of the hardy sorts should be planted the beginning of April on a shady border, where, if they are now and then refreshed with water, if the season should prove dry, they will soon take root. When the slips have made good roots, they may be taken up with balls of earth, and transplanted where they are to remain, which should always be upon a dry soil, and where they may have the benefit of the sun: for if they are planted on a moist soil, or in a shady situation, they are very subject to be destroyed in winter; nor will these plants endure the cold so well, when planted upon a rich soil, as those which have a barren, dry, rocky soil, which is the case of most of the verticillate plants; for these will often grow upon walls, where, although they are more exposed to the cold than those plants in the ground, they are always found to remain in severe winters when the others are destroyed. The side shoots and tops of these plants may be gathered in the summer, and dried, if designed for tea, otherwise they are best taken green from the plants for most other uses. The roots of the common sorts of Sage will last several years, if they are in a dry warm soil; but where they are often cropped for use, the plants will become ragged, so there should be a succession of young ones raised every other year.

The fifth, sixth, and eighth sorts are somewhat tender, so will not live through the winter in the open air in England, therefore these must be planted into pots filled with fresh, light, sandy earth, and in winter they must be removed under a hot-bed frame, that they may have a great share of fresh air whenever the season is mild; for if they are too much drawn, they seldom flower well, and make but an indifferent appearance. In summer they must be exposed amongst other exotic plants in some well-sheltered situation, for they are pretty hardy, and only require to be sheltered from the frost. These plants must be often refreshed with water in warm weather, otherwise they will shrivel and decay; and they should be new-potted at least twice every summer, because their roots will greatly increase, which, if confined in the pots too long, will turn mouldy and decay.

The seventh and ninth sorts are annual plants, so are only propagated by seeds; these may be sown upon a bed of light earth in the places where they are to remain. The seeds of the seventh sort should be sown in autumn, and then the plants will come up the following spring; but, if they are kept out of the ground till spring, the plants will not come up till the next year. Those of the ninth sort may be sown the beginning of April upon a warm border, where the plants will appear in May, and require no other care but to thin them where they grow too close, and keep them clean from weeds; and if they should grow tall, they must be supported, otherwise the strong winds will break them down; but the seventh sort spreads its branches upon the ground, so will require no support, therefore this only requires to have room, and to be kept clean from weeds.

The tenth, eleventh, and twelfth sorts are natives of a warmer country, so these require protection in winter; they are easily propagated by cuttings in the spring and summer months. If these are planted early in the spring, it will be the better way to plant them in pots, which should be plunged into a very moderate hot-bed; and, if they are shaded from the sun in the heat of the day, and gently refreshed with

Water

water as they may require it, they will have put out good roots in about two months, when they should be inured gradually to the open air, into which they should be removed soon after. The cuttings, which are raised early in the season, will become strong plants before winter, so will be in a better condition to resist the cold than those which are weak.

If the cuttings are planted in summer, they will require no artificial heat, so that if these are planted on a bed of fresh loamy earth, and covered close down with a bell or hand-glass, and shaded from the sun in the heat of the day, giving them now and then a little water, they will take root freely; and when they begin to shoot, they should have free air admitted to them by raising the glass on one side, and so gradually exposed to the open air. When the plants are well rooted, they should be each transplanted into a separate small pot filled with fresh light earth, and placed in a shady situation till they have taken new root; then they may be removed to a sheltered situation, where they may remain till the approach of frost, when they must be carried into shelter, and in winter treated in the same manner as other hardy green-house plants, which only require protection from frost, observing not to over-water them during the cold weather, but in summer, when they are in the open air, they will require it often.

SALVIA AGRESTIS. See TEUCRIUM.

SAMBUCUS. Tourn. Inst. R. H. 606. tab. 376. Lin. Gen. Plant. 334. [so called of sambuca, a musical instrument made of this wood, and used by the ancients.] The Elder-tree; in French, *Sureau*.

The CHARACTERS are,

The flower has a small permanent empalement of one leaf, cut into five parts; it has one concave wheel-shaped petal, cut into five obtuse segments at the brim, which are reflexed, and five awl-shaped stamina the length of the petal, terminated by roundish summits, with an oval germen situated under the flower, having no style, in room of which is a swelling gland, crowned by three obtuse stigmas. The germen afterward becomes a roundish berry with one cell, including three angular seeds.

This genus of plants is ranged in the third section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and three styles.

The SPECIES are,

1. SAMBUCUS (*Nigra*) caule arboreo ramoso, floribus umbellatis. Flor. Leyd. Prod. 243. *Elder with a branching tree-like stalk, and flowers growing in umbels.* Sambucus fructu in umbellâ nigro. C. B. P. 456. *Common Elder with black berries growing in an umbel.*
2. SAMBUCUS (*Laciniata*) foliis pinnatifidis, floribus umbellatis, caule fruticoso ramoso. *Elder with wing-pointed leaves, flowers growing in umbels, and a shrubby branching stalk.* Sambucus laciniato folio. C. B. P. 456. *Cut-leaved Elder, commonly called Parsley-leaved Elder.*
3. SAMBUCUS (*Racemosa*) racemis compositis, ovatis, caule arboreo. Lin. Sp. Plant. 270. *Elder with oval compound bunches of flowers, and a tree-like stalk.* Sambucus racemosa rubra. C. B. P. 456. *Red-berried Mountain Elder.*
4. SAMBUCUS (*Ebulus*) caule herbaceo ramoso, foliolis dentatis. Tab. 226. *Elder with a branching herbaceous stalk, and the small leaves indented.* Sambucus humilis, five Ebulus. C. B. P. 456. *Dwarf Elder, or Ebulus.*
5. SAMBUCUS (*Humilis*) caule herbaceo ramoso, foliolis lineari-lanceolatis acutè dentatis. *Elder with an herbaceous branching stalk, and linear spear-shaped lobes which are sharply indented.* Sambucus humilis, five Ebulus folio laciniato. C. B. P. 456. *Dwarf Elder, or Ebulus, with a cut leaf.*
6. SAMBUCUS (*Canadensis*) cymis quinquepartitis, foliis sub-bipinnatis, caule frutescente. Lin. Sp. Plant. 385. *Canada Elder with winged leaves, and a shrubby stalk.*

The first sort here mentioned is the common Elder, which is so well known as to need no description; of this there are the following varieties, viz. the white and green berried Elder, and the variegated leaved

Elder. The latter is undoubtedly a variety, but I much doubt if the white is not a distinct species, for the lobes of the leaves are much less, and are very slightly sawed on their edges, whereas those of the common sort are deeply sawed; they are also smoother and of a lighter green, and the plants which have been raised from the berries have not altered, so there is great reason for supposing them different species; but as I have made but one trial of this, I am unwilling to determine upon a single experiment, but shall leave it as a doubt till further trial is made.

The second sort is generally titled Parsley-leaved Elder, by the gardeners; this is by some supposed to be only a variety of the first, but there can be little reason for doubting of its being a distinct species. The lobes of these leaves are narrower than those of the first, and are cut into several segments; these are again deeply indented on their edges regularly, in form of winged leaves. The stalks of this are much smaller than those of the first, and the shoots are short; the leaves have not so strong an odour, and their berries are a little smaller.

The third sort grows naturally upon the mountains in Germany and Italy; this sends up many shrubby stalks from the root, which rise ten or twelve feet high, and divide into many branches, which are covered with a brown bark; the leaves come out opposite; those on the lower part of the branches are composed generally of two pair of lobes, terminated by an odd one; these are shorter and broader than those of the common Elder, and are deeply sawed on their edges; the leaves on the upper part of the branches have frequently but three lobes; they are of a pale green colour, and pretty smooth. The flowers come out at the end of the shoots in oval bunches, which are composed of several smaller; they are of an herbaceous white colour, and appear in April; these are sometimes succeeded by berries in England, which are red when ripe.

The fourth sort grows naturally in many of the midland counties in England, where it is frequently a troublesome weed in the fields; this is called Dwarf Elder, Danewort, and Walwort. It hath creeping roots which spread far in the ground on every side, so propagates very fast wherever the plant once gets possession; the stalks are herbaceous, and rise from three to five feet high, in proportion to the goodness of the ground, and send out a few side branches toward the top; they are garnished with winged leaves, composed of six or seven pair of narrow lobes, terminated by an odd one; these are about four inches long, and one broad near their base, ending in acute points; they are of a deep green, a little indented on their edges, and are placed by pairs along the midrib. The flowers grow in umbels at the top of the stalks; they are of the same form with those of the common Elder, but are smaller, and are spotted with red. These appear in July, and are succeeded by black berries like those of the common Elder, but are smaller.

This plant is frequently used in medicine; it purges ferous watery humours by stool, and is therefore much recommended for the dropsy, in which disorder I have known the juice of this plant perform wonders in a short time; it was administered three times a week, two spoonfuls was the dose given at each time. It is also accounted a good medicine for the gout, and scorbutic disorders. The young shoots of the common Elder are frequently sold for this in the markets, from which it may be easily distinguished, by the number and shape of the lobes on each leaf: the common Elder has seldom more than five lobes to each leaf, which are broader and much shorter than those of the Dwarf Elder, and are pretty deeply sawed on their edges; but the leaves of the Dwarf Elder have nine, eleven, or thirteen lobes to each leaf, which are long, narrow, and very slightly indented on their edges.

The roots of the fifth sort do not creep so much in the ground as those of the fourth; the stalks are herbaceous, but do not rise so high, and are closely gar-

nished with leaves which have seldom more than seven lobes to each, and toward the top of the stalks but five; these are longer and narrower than those of the former, and are deeply cut on their edges, ending with winged acute points. The flowers are produced in umbels at the top of the stalks, which are shaped like those of the former, and are succeeded by the like berries.

The sixth sort grows naturally in North America, where it rises to the height of twenty feet, but in England it is seldom seen much more than half that height; and while the plants are young and full of sap, the frost frequently kill their young shoots almost to the ground; and in wet autumns, when the shoots are replete with moisture, the early frosts frequently injure them.

The leaves of this sort have generally seven or nine lobes, which are longer and narrower than those of the common Elder, and the berries are smaller than those of that sort, but of the same black colour, though not so full of juice, nor have the leaves so strong a scent.

The three first sorts may be easily propagated from cuttings, or by sowing their seeds; but the former being the most expeditious method, is generally practised. The season for planting of their cuttings is any time from September to March, in the doing of which, there needs no more care than to thrust the cuttings about six or eight inches into the ground, and they will take root fast enough, and may afterwards be transplanted where they are to remain, which may be upon almost any soil or situation; they are extreme hardy, and if their seeds are permitted to fall upon the ground, they will produce plenty of plants the succeeding summer.

These trees are often planted for making fences, because of their quick growth; but as their bottoms become naked in a few years, they are not so proper for that purpose; neither would I recommend them to be planted near habitations, because at the season when they are in flower, they emit such a strong scent, as will occasion violent pains in the heads of those who abide long near them; besides, the crude parts which are continually perspired through their leaves, are accounted unwholesome, though the leaves, bark, and other parts, are greatly esteemed for many uses in medicine.

The fourth sort propagates itself fast enough wherever it is once planted, by its creeping roots, so that it is very difficult to keep it within bounds, therefore is not a proper plant for gardens; but those who are inclined to keep it for medicinal use, need only plant one or two of the roots in any abject part of a garden or field, and the place will soon be spread over with it.

The fifth sort is preserved in botanic gardens for the sake of variety, but is seldom admitted into other gardens. This propagates by the root, though not so fast as the other.

The sixth sort will put out roots from cuttings, almost as well as the common Elder; but as it is liable to injury from severe frosts, so it should be planted in a sheltered situation.

The common Elder will grow upon any soil or in any situation; the trees are frequently seen growing on the top, and out of the side of old walls; and they are often seen growing close to ditches, and in very moist places; so that wherever the seeds are scattered, the plants will come up, as they often do from the hollow of another tree. The leaves and stalks of this plant are so bitter and nauseous, that few animals will browse upon it. I have often seen the trees growing in parks, where there has been variety of animals, and have observed they were untouched, when almost all the other trees within reach have been cropped by the cattle.

The young shoots of this tree are strong and very full of pith, but as the trees grow old, their wood becomes very hard, and will polish almost as well as that

of the Box-tree, so is often used for the same purposes, where Box-wood is scarce.

The bark, leaves, flowers, and berries of this tree, are used in medicine. The inner bark is esteemed good for dropries, the leaves are outwardly used for the piles and inflammations. The flowers are inwardly used to expel wind, and the berries are esteemed cordial and useful in hysteric disorders, and are frequently put into gargarisms for sore mouths and throats.

SAMOLUS. Tourn. Inst. R. H. 143. tab. 60. Lin. Gen. Plant. 205. Round-leaved Water Pimpernel.

The CHARACTERS are,
The empalement of the flower is permanent, erect, and cut into five segments. It has one petal, with a short spreading tube; the brim is plain, obtuse, and cut into five parts. It has five short stamina placed between each segment of the petal, terminated by summits which join together. The germen is situated under the flower, supporting a slender style, crowned by a beaded stigma. The germen afterward becomes an oval capsule with one cell, cut half through into five valves, filled with small oval seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one style.

We have but one SPECIES of this plant, viz.
SAMOLUS (*Valerandi*) valerandi. J. B. Round-leaved Water Pimpernel.

This plant grows wild in swampy places, where the water usually stands in winter, and is seldom preserved in gardens. It is an annual plant which flowers in June, and the seeds are ripe in August; at which time, whoever hath a mind to cultivate this plant, should sow the seeds on a moist soil, where the plants will come up, and require no farther care but to keep them clean from weeds.

SAMYDA. Lin. Gen. Plant. 525. Guidonia. Plum. Nov. Gen. 4. tab. 24.

The CHARACTERS are,
The flower has a rough bell-shaped empalement of one leaf, which is cut at the brim into five points, which spread open. It has no petal, but has fifteen short awl-shaped stamina inserted in the empalement, terminated by oval summits, and a hairy globular germen, supporting a cylindrical style, crowned by a beaded stigma. The germen afterward becomes an oval berry with four furrows, having four cells, including many kidney-shaped seeds immersed in the oval receptacle.

This genus of plants is ranged in the first section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and one style.

The SPECIES are,
1. SAMYDA (*Serrulata*) floribus dodecandris foliis ovato-oblongis serrulatis. Lin. Sp. Plant. 558. *Samyda* with oblong, oval, sawed leaves, and flowers with twelve stamina. Guidonia ulmi foliis, flore roseo. Plum. Nov. Gen. 4. Guidonia with Elm leaves, and a Rose-coloured flower.

2. SAMYDA (*Parviflora*) floribus decandris foliis, ovato-oblongis, utrinque glabris. Lin. Sp. Plant. 557. *Samyda* with flowers having ten stamina, and oblong, oval, smooth leaves. Guidonia nucis juglandis folio. Plum. Nov. Gen. 4. Guidonia with a Walnut-tree leaf.

These plants grow naturally in the West-Indies; the first sort rises with a shrubby stalk six or eight feet high, sending out several weak branches, which are garnished with oval leaves drawing to a point; they are an inch and a half long, and one inch broad, sawed on their edges, and of a light green colour. The flowers come out from the wings of the leaves upon short foot-stalks; they have a five-leaved empalement, which is of a bright red within; the stamina which are about ten in number, are inserted in the empalement, and stand erect; and in the center is situated an oval germen, which turns to a berry with four cells, containing small seeds.

S A N

The other sort has leaves shaped like those of the former, but are longer and smooth; the inside of the empalement is of a purple colour, in which it differs from the first.

These plants are propagated by seeds, which must be procured from the countries where they naturally grow; these must be sown upon a hot-bed in the spring, and when the plants come up, they must be planted in small pots filled with good kitchen-garden earth, and plunged into a hot-bed of tanners bark, and treated in the same way as other tender plants from the same countries. These should be kept in the bark-bed in the stove till they have acquired strength, then they may be exposed in summer, but in winter they require a good green-house.

S A N D, as Dr. Boerhaave defines it, is earth properly so called, which is a fossil body, neither dissoluble by fire, water, nor air; insipid and untransparent, more fusible than stone, still friable, and containing usually a share of fatness.

Dr. Lister divides the English Sands into two classes; the first, sharp or rag Sand, consisting of small transparent pebbles, naturally found on the mountains, and not calcinable; these he farther divides into fine and coarse, and subdivides each, according to the colours, into white, gray, reddish, brown, &c.

The second, soft or smooth, which he subdivides into that with flat particles broken from lime stones, that with silver-like particles, and that with gold-like particles.

As to Sand, its use is to make the clayey earth fertile, and fit to feed vegetables, &c. for earth alone, we find, is liable to coalesce, and gather into a hard coherent mass, as is apparent in clay; and earth thus embodied, and as it were, glued together, is no ways disposed to nourish vegetables; but if with such earth, Sand, &c. i. e. hard crystals, which are not dissolvable in water, and still retain their figure, be intermixed, they will keep the pores of the earth open, and the earth itself loose and incompact, and by that means give room for the juices to ascend, and for plants to be nourished thereby.

Thus a vegetable, planted either in Sand alone, or in a fat glebe, or earth alone, receives no growth or increment at all, but is either starved or suffocated; but mix the two, and the mass becomes fertile. In effect, by means of Sand, the earth is rendered, in some manner, organical; pores and interstices being hereby maintained, something analogous to vessels, by which the juices may be conveyed, prepared, digested, circulated, and at length excerned, and thrown off into the roots of plants.

Grounds that are sandy and gravelly, easily admit both of heat and moisture; but then they are liable to these inconveniencies, that they let them pass too soon, and so contract no ligature, or else retain it too long, especially where there is a clay bottom; and by that means it either parches or chills too much, and produces nothing but Moss and cankerous infirmities; but if the Sand happens to have a surface of good mould, and a bottom of gravel or loose stone, though it do not hold the water, it may produce a forward sweet Grass; and though it may be subject to burn, yet it quickly recovers with the least rain.

Sea Sand is accounted a very good compost for stiff ground, for it effects the two following things, viz. it makes way for the tree or seed to root in stiff ground, and makes a fume to feed it.

Sand indeed is apt to push the plants that grow upon it, early in the spring, and make them germinate near a month sooner than those that grow upon clay, because the salts in the Sand are at full liberty to be raised and put into motion, upon the least approach of the warmth of the sun; but then as they are hasty, they are soon exhaled and lost.

SANGUINARIA. Dill. Hort. Elth. 252. Lin. Gen. Plant. 570. Puccoon.

The CHARACTERS are,

The empalement of the flower is composed of two oval

S A N

concave leaves, which fall away. It has eight oblong, obtuse, spreading petals, which are alternately narrow. It has many single stamina which are shorter than the petals, terminated by single summits, and an oblong compressed germen having no style, crowned by a permanent thick stigma with two channels. The germen becomes an oblong bellied capsule with two valves, pointed at both ends, inclosing round acute-pointed seeds.

This genus of plants is ranged in the first section of Linnæus's thirteenth class, which includes those plants whose flowers have many stamina and one style.

We have but one SPECIES of this genus, viz.

SANGUINARIA (*Canadensis*.) Hort. Cliff. 202. Puccoon.

Chelidonium majus, Canadense acaulon. Corn. Canad.

212. *Greater Celandine of Canada having no stalks.*

There are some few other varieties of this plant mentioned in the Eltham Garden, but they are not distinct species, for they vary annually, therefore it is to no purpose to mention their variations.

This plant was formerly ranged in the genus of Celandine, by the title of *Chelidonium maximum Canadense acaulon*; and this name of *Sanguinaria* was applied to it by Dr. Dillenius, who was professor of botany at Oxford. We have no proper English name for this, but as the inhabitants of America call it by the Indian name Puccoon, I have continued it here.

It is a native of most of the northern parts of America, where it grows plentifully in the woods; and in the spring, before the leaves of the trees come out, the surface of the ground is, in many places, covered with the flowers, which have some resemblance to our Wood Anemone, but they have short naked pedicles, each supporting one flower at the top. Some of these flowers will have ten or twelve petals, so that they appear to have a double range of leaves, which has occasioned their being termed double flowers; but this is only accidental, the same roots in different years producing different flowers. The roots of this plant are tuberous, and the whole plant has a yellow juice, which the Indians use to paint themselves.

This plant is hardy enough to live in the open air in England, but it should be planted in a loose soil and a sheltered situation, but not too much exposed to the sun. It is propagated by the roots, which may be taken up and parted every other year; the best time for doing of this is in September, that the roots may have time to send out fibres before the hard frost sets in. The flowers of this plant appear in April, and when they decay, the green leaves come out, which will continue till Midsummer; then they decay, and the roots remain unactive till the following autumn; so that unless the roots are marked, it will be pretty difficult to find them after their leaves decay, for they are of a dirty brown colour on the outside, so are not easily distinguished from the earth.

This plant is very proper to mix with the Dog's-tooth Violet, Spring Cyclamen, Persian Iris, Bulbocodium, Sisyrinchium, and some other low growing bulbous and tuberous-rooted flowers, which require the same culture, where these will add to the variety when they are in beauty; for when the roots are strong and grow in a good soil, they will produce a great number of flowers upon each root; the roots may be planted about four or five inches asunder every way.

SANGUIS DRACONIS. See PALMA.

SANGUISORBA. Lin. Gen. Plant. 136. Pimpinella. Tourn. Inst. R. H. 156. tab. 69. Burnet, called by the French *Pimpernel*.

The CHARACTERS are,

The empalement of the flower is composed of two short leaves placed opposite, which fall away. The flower hath one plain petal, cut into four obtuse segments, which join at their base. It has four stamina the length of the petal, terminated by small roundish summits, and a four-cornered germen situated between the empalement and petal, supporting a short slender style, crowned by an obtuse stigma.

ma. The germen afterward turns to a small capsule with two cells, filled with small seeds.

This genus of plants is ranged in the first section of Linnæus's fourth class, which includes those plants whose flowers have four stamina and one style.

The SPECIES are,

1. SANGUISORBA (*Officinalis*) spicis ovatis. Hort. Cliff. 39. *Sanguisorba with oval spikes.* Pimpinella sanguisorba major. C. B. P. 160. *Greater Burnet.*
2. SANGUISORBA (*Subauda*) spicis cylindricis, foliis cordato-oblongis, rigidis, ferratis. *Sanguisorba with cylindrical spikes, the lobes of the leaves oblong, heart-shaped, stiff, and sawed.* Pimpinella major, rigida, præalta, auriculata, subauda. Bocc. Mus. 2. 19. *Taller, acid, great Burnet of Savoy, with eared leaves.*
3. SANGUISORBA (*Hispanica*) spicis orbiculatis compactis. *Sanguisorba with round compact spikes.* Pimpinella major Hispanica altera, conglomerato flore. H. R. Par. *Another great Burnet of Spain, with a conglomerated flower.*
4. SANGUISORBA (*Canadensis*) spicis longissimis. Hort. Cliff. 39. *Sanguisorba with the longest spikes.* Pimpinella maxima Canadensis. Corn. 174. *Greatest Canada Burnet.*

The first sort grows naturally in moist meadows in divers parts of England; the stalks of this rise from two to near three feet high, branching toward the top, and are terminated by thick oval spikes of flowers, of a grayish brown colour, which are divided into four segments almost to the bottom. These appear in June, and are each succeeded by four oblong cornered seeds, which ripen in August. The leaves of this sort are composed of five or six pair of lobes placed along a midrib, terminated by an odd one; the lobes are about two inches long, and one broad at their base, drawing narrower to their point; they are thin, sawed on their edges, and a little downy on their under side.

The second sort grows naturally in Piedmont; this rises with stiff upright stalks more than three feet high, branching out toward the top, each branch being terminated by a cylindrical spike of brown flowers, shaped like those of the former sort, but are smaller. The leaves are long, the foot-stalks are very strong, and much longer than those of the first sort; the leaves have seven or eight pair of stiff lobes, terminated by an odd one; these are oblong, heart-shaped, deeply sawed on their edges, of a lucid green on their upper side, but pale on their under, having pretty long foot-stalks, at the base of which come out two small roundish leaves or ears, which are deeply indented. This retains its difference when propagated by seeds, so is undoubtedly a distinct species.

The leaves of the third sort are smaller than those of the first, having but four pair of lobes to each, terminated by an odd one; these are bluntly sawed on their edges, and have very short foot-stalks; they are of a pale green on their upper side, and hoary on their under. The stalks rise about two feet high, and branch pretty much toward their top, and are terminated by round heads or spikes of reddish flowers, which appear in July, and are succeeded by seeds which ripen in autumn. It grows naturally in Spain.

The fourth sort grows naturally in North America; this hath leaves like those of the first sort, but are a little stiffer; they are composed of four or five pair of lobes, terminated by an odd one; those on the lower part of the midrib stand alternate, but the two upper pair are opposite; they are of a light green colour, and deeply sawed on their edges. The stalks rise three feet high, dividing toward the top into small branches, which stand erect, and are terminated by long spikes of flowers of an herbaceous white colour, each standing upon a short foot-stalk.

There is another with long spikes of red flowers, which grows naturally in the same countries, whose stalks rise higher; the spikes of flowers are thicker, the lobes of the leaves are broader, and are whiter on their under side; but whether this is a distinct species, or an accidental variety of the fourth, I cannot as yet determine.

All these sorts are very hardy perennial plants, and will thrive in almost any soil or situation. They may be propagated either by seeds or parting of the roots; if they are propagated by seeds, they should be sown in the autumn, for when they are sown in the spring, they seldom grow the same year: when the plants come up, they must be kept clean from weeds till they are strong enough to transplant, when they may be planted in a shady border, at about six inches distance each way, observing to water them till they have taken new root, after which they will require no other care but to keep them clean from weeds till autumn, when they may be transplanted to the place where they are to remain; the following summer they will produce flowers and seeds, but their roots will abide many years.

If the roots are parted, it should be done in autumn, that they may get good root before the dry weather comes on in the spring.

The other sorts of Burnet are referred to the article POTERIUM.

SANICULA. Tourn. Inst. R. H. 326. tab. 173. Lin. Gen. Plant. 289. [so called from sanando, healing, because good in many distempers.] Sanicle.

The CHARACTERS are,

It is a plant with an umbellated flower. The universal umbel hath but few rays, and the involucre is situated but half round on the outside; the partial umbels have many clustered rays, and their involucres surround them on every side; the empalement of the flower is scarce discernible; the flowers have five compressed petals which are bifid, and turn inward; they have five erect stamina which are twice the length of the petals, terminated by roundish summits, and a bristly germen situated under the flower, supporting two awl-shaped styles, which are reflexed, crowned by pointed stigmas. The germen afterward becomes a rough oval-pointed fruit, dividing into two parts, each containing one seed.

This genus of plants is ranged in the second section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and two styles.

There is but one SPECIES of this plant, which is a native in England, viz.

SANICULA (*Europæa*) foliis radicalibus simplicibus flosculis omnibus sessilibus. Flor. Suec. 235. *Sanicle whose lower leaves are single, and all the flowers sitting close to the stalk.* Sanicula officinarum. C. B. P. *Sanicle, or Self-heal.*

This plant is found wild in woods and shady places in many parts of England, but being a medicinal plant may be propagated in gardens for use. It may be increased by parting the roots, any time from September to March, but it is best to do it in the autumn, that the plants may be well rooted before the dry weather in spring comes on; they should have a moist soil and a shady situation, in which they will thrive exceedingly.

SANTOLINA. Tourn. Inst. R. H. 460. tab. 260. Lin. Gen. Plant. 847. [so called, on account of its great virtue; q. d. Sancta Herba, i. e. the Holy Herb.] Lavender-cotton; in French, *Petit Cyprès*, or *Garde-robe*.

The CHARACTERS are,

It hath a compound flower with a scaly hemispherical empalement. The flower is uniform, composed of many hermaphrodite florets which are longer than the empalement; these are funnel-shaped, and cut into five parts at the top, which turn backward; they have five fine very short hair-like stamina terminated by cylindrical summits, and an oblong four-cornered germen, supporting a slender style, crowned by two oblong, depressed, torn stigmas. The germen afterward becomes a single, oblong, four-cornered seed, which is either naked, or crowned with very short down, ripening in the common empalement.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which contains those plants whose flowers are composed only of hermaphrodite fruitful florets, and the stamina are connected with the style.

The SPECIES are,

1. SANTOLINA (*Chamæcyparissus*) pedunculis unifloris, foliis quadrifariam dentatis. Hort. Cliff. 397. *Lavender-cotton with one flower upon a foot-stalk, and leaves indented four ways.* Santolina foliis teretibus. Tourn. Inst. 460. *Common Lavender-cotton.*
2. SANTOLINA (*Villosa*) pedunculis unifloris, calycibus globosis, foliis quadrifariam dentatis tomentosis. *Lavender-cotton with one flower upon a foot-stalk, globular empalements, and woolly leaves which are indented four ways.* Santolina flore majore, foliis villosis & incanis. Tourn. Inst. 460. *Lavender-cotton with a larger flower and hoary leaves.*
3. SANTOLINA (*Decumbens*) pedunculis unifloris, caulibus decumbentibus, foliis linearibus quadrifariam dentatis. *Lavender-cotton with one flower upon a foot-stalk, declining foot-stalks, and linear leaves which are four ways indented.* Santolina repens & canescens. Tourn. Inst. 460. *Creeping hoary Lavender-cotton.*
4. SANTOLINA (*Virens*) pedunculis unifloris, foliis linearibus longissimis bifariam dentatis. *Lavender-cotton with one flower upon a foot-stalk, and very long linear leaves which are two ways indented.* Santolina foliis obscure virentibus, flore aureo. Tourn. Inst. 461. *Lavender-cotton with dark green leaves, and golden flowers.*
5. SANTOLINA (*Rosmarinifolia*) pedunculis unifloris, capitulis globosis, foliis linearibus integerrimis. *Lavender-cotton with one flower upon a foot-stalk, globular heads, and linear entire leaves.* Santolina foliis rorismarini major. Tourn. Inst. 491. *Great Lavender-cotton with Rosemary leaves.*
6. SANTOLINA (*Minor*) pedunculis unifloris, foliis linearibus confertis obtusis. *Lavender-cotton with one flower upon a foot-stalk, and linear obtuse leaves growing in clusters.* Santolina foliis rorismarini minor. Tourn. Inst. 461. *Smaller Lavender-cotton with Rosemary leaves.*
7. SANTOLINA (*Chamæmelifolia*) pedunculis unifloris, foliis longioribus tomentosis, duplicato dentatis. *Lavender-cotton with one flower upon a foot-stalk, and longer woolly leaves which are twice indented.* Santolina incana chamæmeli odore suaviore. Boerh. Ind. alt. 123. *Hoary Lavender-cotton with a soft Chamomile scent.*

The first sort is the common Lavender-cotton which has been long known in the English gardens; it was formerly titled Abrotanum fœmina, or Female Southernwood, and by the corruption of words was called Brotany by the market-people; it grows naturally in Spain, Italy, and the warm parts of Europe. This hath a shrubby stalk dividing into many ligneous branches, which are garnished with slender hoary leaves, that are four ways indented, and have a rank strong odour when handled. The branches divide toward the top into several slender stalks, whose lower parts are garnished with a few small leaves of the same shape as the other, but are naked above, and terminated by a single flower, composed of many hermaphrodite florets which are fistular, and cut into five parts at the top; they are of a sulphur colour, and are included in one common scaly empalement, and have no borders or rays. These appear in July, and are succeeded by small, oblong, striated seeds, which are separated by scaly chaff, and ripen in the empalement; these will rise near three feet high in a dry soil and a sheltered situation. The leaves, and sometimes the flowers, are used in medicine, and are reputed good to destroy worms; it is sometimes called Chamæcyparissus, or Dwarf Cypress.

The second sort has a shrubby stalk which branches out like the former, but the plants seldom grow so tall. The branches are divided into a great number of stalks, which are short, hoary, and garnished very closely below with leaves shaped like those of the other sort, but are shorter, thicker, and whiter; the flowers are much larger, and the brims of the florets are more reflexed; they are of a deeper sulphur colour than the other, but appear at the same time. It grows naturally in Spain.

The third sort is of lower stature than either of the former, seldom rising more than fifteen or sixteen

inches high. The branches spread horizontally near the ground, and are garnished with shorter leaves than either of the former; these are hoary, and finely indented; the stalks are short, and are terminated by single flowers of a bright yellow colour, which are larger than those of the first sort.

The fourth sort rises higher than either of the former. The branches are disposed looser, and are more diffused; they are slender, smooth, and garnished with very narrow long leaves, which are of a deep green colour, and but two ways indented; the stalks are slender, naked toward the top, and terminated by single flowers of a gold colour, which appear at the same time with the former.

The fifth sort hath shrubby stalks which rise about three feet high, sending out long slender branches, which are garnished with single linear leaves about an inch and a half long, of a pale green colour, and entire. The stalks are terminated by large, single, globular flowers, of a pale sulphur colour, which appear about the same time as the former.

The sixth sort is somewhat like the fifth, but the branches are shorter, thicker, and closer garnished with leaves, which come out in clusters; they are shorter, and have blunt points. The flower-stalks are sparsely disposed, and have leaves to their top; the flowers are small, and of a yellow colour.

The seventh sort hath shrubby stalks which rise near three feet high, and divide into many branches which are hoary, and garnished with broader leaves than either of the former, whose indentures are looser, but double; they are hoary, and when bruised have an odour like Chamomile. The leaves are placed pretty far asunder, and the stalks are garnished with them to the top. The stalks are divided likewise at the top into two or three foot-stalks, each sustaining one pretty large sulphur-coloured flower.

The first of these plants is cultivated in gardens for medicinal use, and the six next are propagated by the gardeners near London for furnishing balconies, and other little places in and near the city, by way of ornament. These seven sorts are hardy plants, which will thrive in the open air, provided they are planted in a poor dry soil, for in such ground the plants will be stunted, so will be hardy and better able to resist the cold; and they will have a better appearance than those which are in rich ground, whose branches will be long and diffused, so by hard rains or strong winds are displaced, and sometimes broken down; whereas, in poor land, they will grow compact, and the plants will continue much longer.

These plants may be cultivated so as to become ornaments to a garden, particularly in small bosquets of evergreen shrubs, where, if they are artfully intermixed with other plants of the same growth, and placed in the front line, they will make an agreeable variety, especially if care be taken to trim them twice in a summer to keep them within bounds, otherwise their branches are apt to straggle, and in wet weather to be borne down and displaced, which renders them unsightly; but, when they are kept in order, their hoary and different-coloured leaves will have a pretty effect in such plantations.

These plants may be propagated by planting slips or cuttings of any of the kinds during the spring, which should be put into a border of light fresh earth, and watered and shaded in dry weather until they have taken root, after which they will require no farther care, but to keep them clear from weeds till autumn, when they should be carefully taken up, and transplanted where they are designed to remain; but if the ground is not ready by that time to receive them, it will be proper to let them remain in the border until spring; for if they are transplanted late in autumn, they are liable to be destroyed by cold in winter.

SANTOLINA. See ATHANASIA and TANACETUM.

SAP: the notion of the Sap's circulation was entertained by several authors much about the same time, without any communication from one another, particularly M. Major, a physician of Hamburgh, M. Per-

rault, Mariotte, and Malpighi. It has met, however, with some considerable opposers, particularly the excellent M. Dodart, who could never be reconciled to it.

One of the great arguments for it is, That the same experiments of ligature and incision, which evince a circulation of the blood in animals, succeed in the like manner in plants, particularly in such as abound with a milky sap, as the Great Tithymale, Milk-thistle, &c. if the ligature be fastened tight round them, the part above is found to swell very considerably, and that below it a little, whence it appears, that there is a juice descending from the branches, and that the latter is thicker than the former, which quadrates exactly with the common system, the juice being supposed to arise in capillary-vessels, in form of a subtile vapour, which condensed in the extremes of the plant by the neighbourhood of the cold air, turns back in form of a liquor through the more patent pipes of the inner bark.

M. Dodart, instead of the same juice's going and returning, contends for two several juices, the one imbibed from the soil digested in the root, and from thence transmitting from the extremes of the branches for the nourishing of the plant, the other received from moisture of the air entering in at the extremities of the branches and surfaces of the leaves, so that the ascending and descending juices are not the same.

One of his chief arguments is, That if two trees of the same kind be transplanted in one day, after first cutting off their roots and branches; and if, after they have taken root, some of the new shoots put forth each year be cut off one of from them, it will not thrive half so well, notwithstanding its root and trunk being entire as the other.

This he conceives to be a proof of the plant's deriving nourishment by the branches, and concludes it to be of an aerial nature, because formed of the moisture of the air, dew, &c. whereas that imbibed from soil is terrestrial, &c. Hist. de l'Acad. Roy. Ann. 1709.

But by this experiment we can only reason for the trees so cut, that a great part of the increasing Sap is destroyed, which was contained in these young branches, whereby the trees were deprived of this Sap, so could not make so great progress.

The humour or Sap of a plant, then, is a juice furnished by the earth, and changed into the plant, consisting of some fossil parts, other parts derived from the air and rain, and others from putrefied animals, plants, &c. Consequently, in vegetables are contained all kinds of salts, oil, water, earth, &c. and probably all kinds of metals too, inasmuch as the ashes of vegetables always yield somewhat which the loadstone attracts.

This juice enters the plant in form of a fine and subtile water; which, the nearer it is to the root, the more it retains of its proper nature, and the farther from the root, the more action it has sustained, and the nearer it approaches to the nature of the vegetable. Consequently, when the juice enters the root, the bark whereof is furnished with excretory vessels, fitted to discharge the excrementitious part, it is earthy, watery, poor, acid, and scarce oleaginous at all.

In the trunk and branches it is further prepared, tho' it still continues acid, as we see by tapping or perforating of a tree in the month of February, when it distils a watery juice apparently acid.

The juice, being here carried to the germs or buds, is more concocted; and here, having unfolded the leaves, these come to serve as lungs for the circulation and further preparation of the juice.

For these tender leaves, being exposed to the alternate action of heat and cold, moist nights, and hot scorching days, are alternately expanded and contracted, and the more on account of their reticular texture.

By such means is the juice still further altered and digested, as it is further in the petala or leaves of the flowers which transmit the juice, now brought to a greater subtilty, to the stamina; these communicate

it to the farina or dust in the apices, which is, as it were, the male seed of the plant, where having undergone a further maturation, it is shed into the pistil, which performs the office of an uterus or womb, and thus having acquired its last perfection, it gives rise to a new fruit or plant.

The root or part, whereby vegetables are connected to their matrix, and by which they receive their nutritious juice, consists of an infinite number of absorbing vessels, which, being dispersed through the interstices of the earth, attract or imbibe the juices of the same. Consequently, every thing in the earth that is dissoluble in water; is liable to be imbibed, as air, salt, oil, fumes of minerals, metals, &c. and of these plants really consist.

These juices are drawn from the earth very crude, but by the structure and fabric of the plant, and the various vessels they are strained through, become changed, further elaborated, secreted, and assimilated to the substance of the plant.

The motion of the nutritious juices of vegetables is produced much like that of the blood in animals, by the action of the air; in effect, there is something equivalent to respiration throughout the whole plant. The discovery of this is owing to the admirable Malpighi, who first observed, that vegetables consist of two series or orders of vessels:

1. Such as receive and convey the alimental juices, answering to the arteries, lacteals, veins, &c. of animals.

2. Tracheæ or air-vessels, which are long hollow pipes, wherein air is continually received and expelled, i. e. inspired and expired; within which tracheæ he shews all the former series of vessels are contained.

Hence it follows, that the heat of a year, nay, of a day, of a single hour, or minute, must have an effect on the air included in these tracheæ, i. e. must rarefy it, and consequently dilate the tracheæ, whence arises a perpetual spring or source of action to promote the circulation in plants.

For by the expansion of the tracheæ, the vessels containing the juices are pressed, and by that means the juice contained is continually propelled, and so accelerated, by which propulsion the juice is continually comminuted, and rendered more and more subtile, and so enabled to enter vessels still finer and finer, the thickest part of it being at the same time secreted and deposited into the lateral cells or loculi of the bark to defend the plant from cold, and other external injuries.

The juice having thus gone its stage from the root to the remote branches, and even the flower, and having, in every part of its progress, deposited something both for aliment and defence, what is redundant passes out into the bark, the vessels whereof are inosculated with those wherein the Sap is mounted, and through these it re-descends to the root, and then to the earth again, and thus a circulation is effected.

Thus is every vegetable acted on by heat and cold, during the day-time especially, while the sun's force is considerable, the Sap-vessels squeezed and pressed, and the Sap protruded and raised, and at length evacuated, and the vessels exhausted; and in the night again, the same tracheæ being contracted by the cold of the air, the other vessels are eased and relaxed, and so disposed to receive fresh food for the next day's digestion and excretion.

What course the juice takes after it is imbibed by the roots is not very clear. The vessels that take it up, to convey to the plant, are too fine to be traced, and hence it has been controverted, whether it is by the bark, or the pith, or the woody part, that the plant is fed.

The more common opinion is for the bark. The juice, raised by the capillaries of the wood, is here supposed to descend by the larger fibres, placed in the inmost part thereof, immediately over the wood, in which descent, the Sap, now sufficiently prepared, adds a part of its substance to the contiguous wood,

and thus increases by apposition, and hence it may be, that hollow, carious, or rotten trees, which have neither pith nor wood, excepting just enough to sustain the bark, grow and bear.

Some contend for the wood, which they observe to consist of slender capillary tubes running parallel to each other from the root up the trunk, being proper to receive in a fine vapour; in the ascent whereof the fibres become open, and their substance increased, and thus the trunks of trees are said to increase in their circumference.

As for the pith; as the woody substance of the trunk becomes more woody, the pith is compressed and streightened to such a degree, that in some trees it quite disappears, whence it seems, that its office in vegetation is not very important, since its use is not perpetual. By its spongy substance it should seem fitted to receive any superfluous moisture transuding through the pores of the woody fibres; and, if by the excess of such moisture, or the like cause, it corrupt and rot, as it frequently happens in Elms, the tree seems not to grow worse for it, which is a convincing proof it is of no great use.

The learned Dr. Boerhaave distributes the juices of plants into six classes:

1. The first class comprehends the crude nutritious juice, or the juices of the root and stem of plants, which are little more than the mere matter of the element, as drawn by the root from the body it adheres to, whether it be earth, water, or the like.

This juice is found in every part of the plant, and therefore may be held an universal juice; yet he considers it as the juice of the root and stem, because it is chiefly found in them.

This he takes to be the subacid watery lymph without any specific taste or smell, as not being yet arrived to the maturity of oiliness.

To this class belong those juices, which distil in great abundance from wounds or incisions made in the woody parts of plants; such, e. g. is that tart liquor issuing from the root of the Walnut-tree, when cut off in the month of May.

Such also is that limpid subacid humour flowing out very plentifully at an incision in the Birch-tree, in the month of March, to the quantity of several gallons in a few days.

Such also is the juice issuing out of the Vine wounded in the spring time, which always tastes tartish, and ferments like the Grapes themselves.

This juice may be esteemed as yet fossil, being generated of and in the earth; for the juice of the earth, being received into the canals of these plants retains its nature during two or three circulations, nor doth it immediately commence a vegetable juice.

This class of juices therefore he accounts as the chyle of the plant, being chiefly found in the first order of vessels, viz. in the roots and the body of the plant, which answer to the stomach and intestines of animals.

2. The second class of the juices is that of the leaves, which are the real lungs of plants, and accordingly make a further change of the juice, which they receive from the roots and stem by force of the air. The juice of leaves is different therefore from the first juice, as being more sulphureous, and farther elaborated; not that it derives any sulphur from the sun, but that, its watery part exhaling, it becomes more oily, and less volatile.

The juice of leaves he distinguishes into three kinds: The first is the nutritious juice of the leaves, which is that already described, only further elaborated in the minute vesiculæ of the leaves, and consequently less watery, and more oily and saccharine.

The second is wax, which, exuding out of the leaves, adheres to the surface, and is scraped off by bees with their rough thighs to build their combs withal. This is chiefly afforded by Lavender and Rosemary, upon the latter of which the wax may be plainly perceived sticking to the leaves of it.

The third is manna, not that with which the Israelites were fed in the desert, but a drug sold among us; it

is an essential saccharine salt exuding chiefly by night, and in the summer season, from the leaves of a sort of Ash growing in Calabria and Sicily, and adhering thereto in the form of a crust, to be gathered the next morning ere the sun is up.

The like substance is found to exude from the leaves of the Linden-tree and Poplar, in the heats of May and June, at which time they have an honey taste, and are even seen with a fatty juice on them, which, at the approach of the cold evening, gathers into grains.

3. The third class of juices are those of flowers, or the genital parts of plants: in these are,

First, a pure elaborated volatile oil or spirit, wherein the particular smell of the plant or flower resides, and which, by reason of its extreme volatility, exhales spontaneously, inasmuch that if the flower be laid for some time in a warm place, the odorous juice or spirit will be all fled.

The second is the juice expressed from the flower, which in reality is the same with that of the root and leaves, only farther prepared; it is thicker than the former, and has scarce any smell at all. Thus, if you bruise a Hyacinth, or other fragrant flower, and express the juice, it will be found altogether inodorous. The third is the sweet juice called honey, which exudes from all flowers, Aloes, Colocynthus, and other bitter flowers not excepted.

In all male flowers that have utricles at the bottom of the petala, which Dr. Linnæus styles the nectarium, is found a viscid, ruddy, sweet juice in some plenty, and accordingly we see the children gather Cowslips, Dead Nettle, Honeyuckles, &c. and suck the honey from them. The bees too visit these flowers, and putting in their proboscides or trunks, suck out the honey, and load their stomachs therewith to be afterward discharged and laid up in their combs, so that honey is a vegetable juice.

4. The fourth class of juices are those of the fruit and seed, the preparative whereof is nature's final work, which performed, the plants seem to die for a time, as all animals are seen to languish after the emission of their semen.

The juice of the fruit is like that of the root, only farther elaborated.

The juice of the seed is an essential oil or balm elaborated and exalted to its last perfection. This juice or oil is not found in the very point or embryo in the center of the placenta; all we meet with in that part is a few fine watery particles secreted from the placenta, but it is in the placentuli or cotyledons themselves, which consist of innumerable little folliculi or cells, wherein this juice is contained, serving to defend the embryo, and preserve it from being corrupted by water, which, it is well known, will hardly pass through oil.

Thus, if you take, e. g. Fennel-seed, cut it through the middle, and apply it to the microscope, you will easily perceive a clear shining oil in the cells of each lobe investing the tender embryo. Without this oil it were impossible a seed should live a month, and much less a year or two entire and uncorrupted in the ground.

This oil is found in the seeds of all plants; in some, e. gr. in Almonds, Cocoa-nuts, &c. in very great quantities; in others less, as Pepper, Arum, &c. where one would scarce imagine any oil at all; and these seeds lose their vegetative quality very soon.

5. The fifth class of juices are those of the bark, which is an artful congeries or bundle of perspirative ducts, and absorbent vessels.

Of these juices there are divers species, for the several humours raised and distributed through the leaves, flowers, and other parts of the plants, have all circulated through the bark, and accordingly are frequently found to distil from wounds made therein. In some cases, even the whole plant is no more than bark, the pulp having been eaten out, as in Willows, Elms, &c. which live a long time in that state.

The bark serves divers purposes, for it not only transmits the nutritious juices of the plant, but also contains divers fat oily humours to defend the fleshy parts from the injuries of the weather.

6. As animals are furnished with a panniculus adiposus, usually replete with fat, which invest and covers all the fleshy parts, and screens them from external cold, so are plants encompassed with a bark replete with fat juices, by the means whereof the cold is kept out, and in winter time the spiculæ of ice prevented from fixing and freezing the juices in their vessels; whence it is, that some sorts of trees remain evergreen the year round, by reason their barks have more oil than can be spent and exhaled by the sun, and their leaves are covered with a thick oily film over their surface, which prevents their perspiring so much as other plants, and also defends them from the cold, &c.

All the juices of barks are reducible to eight, viz.

1. The crude, acid, watery juice, called the chyle of the plant.

2. An oily juice, which, bursting the bark in the beginning of the summer, exudes out of several plants, as Cypress, Pine, Fir, Savin, Juniper, and other evergreens, and such alone. This oil dissolves by the smallest degree of warmth, and is easily inflamed, and is that which defends the plant, which is the reason why most of these plants will not thrive in very hot climates.

For balm, or fatty liquor, more glutinous than oil, is nothing but the last mentioned oily juice, which was more fluid during the spring time, but which, by the greater heat of the sun, has evaporated all its most subtle parts, and is converted into a denser liquor. Thus the finer part of oil of Olives being exhaled by the summer's warmth, there remains a thick balsam behind: thus also oil of turpentine, having lost its more liquid parts by heat, becomes of the thick consistence of a balm.

3. A pithy juice, which is the body of the oil itself, inspissates, and turns black, when put into a great warmth: this is the most observed in the Pine and Fir.

5. Resin, which is an oil so far inspissated, as to become friable in the cold, may be procured from any oil by boiling it much and long. Thus, if turpentine be set over a gentle fire, it first dissolves, and becomes an oil, then a balsam, then pitch, and then a resin, in which state it is friable in the cold, fusible by fire, withal inflammable and combustible, dissoluble in spirit of wine, but not in water, which makes the character of resin.

Hence the oil is most abundant in the barks in the winter time, the balsams in summer, and the resin in autumn.

6. Colophony, which is a resin still farther exhausted of its volatile part, being pellucid, friable, and approaching to the nature of glass.

7. Gum, which is an humour exuding out of the bark, and, by the warmth of the sun, concocted, inspissated, and rendered tenacious, but still dissoluble in water, and at the same time inflammable, and scarce capable of being pulverized. This oily mucilage serves as a pigment to cover over, and defend the buds of trees from the injuries of wet and frost in winter, but will melt with a moist warmth, and easily run from them, when the gentle warmth of the spring approaches, nor is ever so far hardened into a crust, as to do any injury to the inclosed shoot. This oily substance always contains in it an acid spirit, which is a preservative against putrefaction.

8. A gummos resin, which is an humour secreted in the bark, and dried by the heat of the sun, and thus constituting a body that is partly gummos, and, as such, tenacious, soluble in water, partly resinous, and therefore friable, and soluble in oil, or spirit of wine, but not in water.

Botanists are now generally agreed, that all plants are furnished with organs and parts necessary both for chylification and sanguification, that they have veins, arteries, heart, lungs, adipose cellules, &c.

If so, it is obvious that there must be some difference between the juices, which have not undergone the action of those parts, and such as have already circulated a number of times.

The several juices hitherto recounted are the first or nutritious juice, called also the chyle of the plant, under such alterations, and new modifications, as it undergoes in being received, and kept some time, in parts of a peculiar structure, as leaves, flower, seed, &c. This last juice, called the blood, is the same nutritious juice farther altered, by being divers times passed through each of these parts, and re-mixed, and at length converted into a new juice, with properties different from any of them all.

To prove the circulation of the Sap, instances are brought from experiments made by Mr. Fairchild, as his budding and inoculating of a Passion-tree, whose leaves are spotted with yellow, into one of that sort of Passion-tree whose leaves are plain; for though the buds did not take, yet after it had been budded a fortnight, the yellow spots began to shew themselves about three feet above the inoculation, and in a little time after that, the yellow spots appeared on a shoot, which came out of the ground from another part of the plant, which has been accounted a plain proof of the Sap's circulation.

Another instance is, another experiment of the same person, who grafted the evergreen Oak, or Ilex, upon the common Oak. The leaves of the common Oak, which was the stock, decayed, and fell off at the usual season of the year, but the evergreen Oak, which was the cyon grafted upon it, held its leaves, and continued shooting in the winter; from whence it is concluded, that when trees drop their leaves, the sap keeps full in motion, and is not gone into the root, as some persons think.

There are also other experiments of the same person, which were shewn before the Royal Society, as the New-England Cedar, or rather Juniper, grafted on the Virginian, and what is taken to prove the circulation in it, is, the branch which was grafted was left several inches below the grafting, which continued growing as well as the upper part above the grafting.

And also another, which is the Viburnum, with the top planted in the ground, which was become roots, and the roots turned up, which were become branches; which plant was in as good a state of growing, as it was in its natural state.

A third experiment of his was on a Pear-tree, which he inarched upon two Pear stocks in March 1721-2, having the roots out of the ground, and was in a good flourishing state, with a branch in blossom, that receives no other nourishment but by the juices that return down the other two branches, which, though it had been done above two years, continued shooting suckers out of the root; which is esteemed as a proof, that the branches are as useful to support the roots, as the roots the branches, and thence he infers, that it is not strange that so many trees miscarry in planting, when there are no branches left to the head to maintain the circulation to the roots.

A fourth experiment he made on the Cedar of Lebanon, grafted on the Larix, which drops its leaves in the winter, yet maintained the Cedar in a flourishing condition, as if it had been on a tree which held its leaves all the winter, and the circulation of juices supported the graft below the grafting, and kept it in as good health as above the grafting.

In opposition to the notion of the circulation of the Sap in trees like that in animal bodies, the Reverend Dr. Hales, in his excellent Treatise on Vegetable Statics, presents us with various experiments, and says,

When the Sap has first passed through that thick and fine strainer, the bark of the root, we then find it in greatest quantities in the most lax part between the bark and wood, and that the same through the whole tree.

And if in the early spring, the Oak, and several other trees, were to be examined near the top and bottom, when

when the Sap first begins to move, so as to make the bark run, and easily peel off, he believes it would be found, that the lower bark is first moistened, whereas the bark of the top branches ought first to be moistened, if the Sap descends by the bark. As to the Vine, he says, he is pretty well assured, that the lower bark is first moistened.

He adds, That it is to be seen in many of the examples of the experiments he has given in that book, what quantities of moisture trees daily imbibe and perspire; now the celerity of the Sap must be very great, if that quantity of moisture must most of it ascend to the top of the tree, then descend, and ascend again, before it is carried off by perspiration.

The defect of a circulation in vegetables seems, in some measure, to be supplied by the much greater quantity of liquor which the vegetable takes in, than the animal, whereby its motion is accelerated; for, by the first example he gives, we find the Sunflower, bulk for bulk, imbibes and perspires seventeen times more fresh liquor than a man every twenty-four hours. Besides, nature's great aim in vegetables being only that the vegetable life be carried on and maintained, there was no occasion to give its Sap the rapid motion which was necessary for the blood of animals.

In animals it is the heart which sets the blood in motion, and makes it continually circulate, but in vegetables we can discover no other cause of the Sap's motion, but the strong attraction of the capillary Sap-vessels, assisted by the brisk undulation and vibrations caused by the sun's warmth, whereby the Sap is carried up to the top of the tallest trees, and is there perspired off through the leaves; but, when the surface of the tree is greatly diminished by the loss of its leaves, then also the perspiration and motion of the Sap is proportionably diminished, as is plain from many of his experiments.

So that the ascending velocity of the Sap is principally accelerated by the plentiful perspiration of the leaves, thereby making room for the fine capillary-vessels to exert their vastly attracting power; which perspiration is effected by the brisk rarefying vibrations of warmth, a power that does not seem to be any ways well adapted to make the Sap descend from the tops of vegetables, by different vessels, to the root.

If the Sap circulated, it must needs have been seen descending from the upper part of large gashes cut in branches set in water, and with columns of water pressing on their bottoms in long glass tubes, in his 43d and 44th experiment.

In both which cases it is certain that great quantities of water passed through the stem, so that it must needs have been seen descending, if the return of the Sap downward were by trusion or pulsion, whereby the blood in animals is returned through the veins to the heart, and that pulsion, if there were any, must necessarily be exerted with prodigious force to be able to drive the Sap through the finer capillaries.

So that if there be a return of the Sap downward, it must be by attraction, and that a very powerful one, as may be seen by many of these experiments, and particularly by experiment the 11th. But it is hard to conceive what and where that power is, which can be equivalent to that provision nature has made for the ascent of the Sap, in consequence of the great perspiration of the leaves.

The instances of the Jasmine-tree, and of the Passion-tree, have been looked upon as proofs of the circulation of the Sap, because their branches, which were far below the inoculated bud, were gilded. But we have many visible proofs in the Vine, and other bleeding trees, of the Sap's receding back, and pushing forward alternately, at different times of the day and night; and there is great reason to think that the Sap of all other trees has such an alternate receding and progressive motion, occasioned by the alternacies of day and night, warm and cold, moist and dry.

For the Sap in all vegetables does probably recede, in some measure, from the tops of branches, as the

sun leaves them, because its rarefying power then ceasing, the greatly rarefied Sap and air mixed with it will condense, and take up less room than they did, and the dew and rain will then be strongly imbibed by the leaves, as is probable from experiment 42, and several others, whereby the body and branches of the vegetable, which have been much exhausted by the great evaporation of the day, may at night imbibe Sap and dew from the leaves.

For, by several experiments in the 1st chapter of the aforesaid book of Vegetable Statics, plants were found to increase considerably in weight in dewy and moist nights.

And by other experiments on the Vine, in the 3d chapter, it was found that the trunk and branches of Vines were always in an imbibing state caused by the great perspiration of the leaves, except in the bleeding season; but, when at night that perspiring power ceases, then the contrary imbibing power will prevail, and draw the Sap and dew from the leaves, as well as moisture from the roots.

And we have a further proof of this in experiment 12, where, by fixing mercurial gauges to the stems of several trees which do not bleed, it is found that they are always in a strongly imbibing state, by drawing up the mercury several inches; whence it is easy to conceive, how some of the particles of the gilded bud in the inoculated Jasmine may be absorbed by it, and thereby communicate their gilding miasma to the Sap of the branches, especially when, some months after the inoculation, the stock of the inoculated Jasmine is cut off a little above the bud, whereby the stock, which was the counter-acting part of the stem, being taken away, the stem attracts more vigorously from the bud.

Another argument for the circulation of the Sap is, that some sorts of grafts will infect and canker the stocks they are grafted on, but by experiment 12 and 37, where mercurial gauges were fixed to fresh-cut stems of trees, it is evident that those stems were in a strongly imbibing state, and consequently the cankered stocks might very likely draw Sap from the graft, as well as the graft alternately from the stock, just in the same manner as leaves and branches do from each other in the vicissitudes of day and night.

And this imbibing power of the stock is so great, where only some of the branches of the stock will, by their strong attraction, starve those grafts, for which reason it is usual to cut off the greatest part of the branches of the stock, leaving only a few small ones to draw up the Sap.

The instance of the Ilex grafted upon the English Oak seems to afford a very considerable argument against a circulation, for if there were a free uniform circulation of the Sap through the Oak and Ilex, why should the leaves of the Oak fall in winter, and not those of the Ilex?

Another argument against an uniform circulation of the Sap in trees, as in animals, may be drawn from Dr. Hale's 37th experiment, viz. where it was found, by the three mercurial gauges fixed to the same Vine, that while some of its branches changed their state of protruding Sap into a state of imbibing, others continued protruding Sap, one nine, and the other thirteen days longer.

That the Sap does not descend between the bark and the wood, as the favourers of a circulation suppose, seems evident from hence, viz. That if the bark be taken off for three or four inches breadth quite round, the bleeding of the tree above that bared place will much abate, which ought to have the contrary effect, by intercepting the course of the refluent Sap, if the Sap descended by the bark.

But the reason of the abatement of the bleeding in this case may be well accounted for, from the manifest proof we have in these experiments, that the Sap is strongly attracted upward by the vigorous operation of the perspiring leaves, and attracting capillaries; but, when the bark is cut off for some breadth

below the bleeding place, then the Sap which is between the bark and the wood below that disbarked place, is deprived of the strong attracting power of the leaves, &c. and consequently the bleeding wound cannot be supplied so fast with Sap, as it was before the bark was taken off.

But the most considerable objection against this progressive motion of the Sap without a circulation, arises from hence, viz. That it is too precipitate a course for a due digestion of the Sap, in order to nutrition, whereas in animals, nature has provided that many parts of the blood shall run a long course before they are either applied to nutrition, or discharged from the animal.

But when we consider that the great work of nutrition in vegetables, as well as animals (I mean, after the nutriment is got into the veins and arteries of animals,) is chiefly carried on in the fine capillary vessels, where nature selects and combines, as shall best suit her different purposes, the several mutually attracting nutritious particles, which were hitherto kept disjoined by the motion of their fluid vehicle. We shall find that nature has made abundant provision for this work in the structure of vegetables, all whose composition is made up of nothing else but innumerable fine capillary vessels, and glandulous portions of vessels.

Upon the whole he thinks we have, from these experiments and observations, sufficient ground to believe, that there is no circulation of the Sap in vegetables, notwithstanding many ingenious persons have been induced to think there was from several curious observations and experiments, which evidently prove that the Sap does in some measure recede from the top toward the lower part of plants, whence they were, with good probability of reason, induced to think that the Sap circulated.

SAPINDUS. Tourn. Inst. R. H. 659. tab. 440. Lin. Gen. Plant. 448. The Sopeberry-tree.

The CHARACTERS are,

The empalement of the flower is composed of four plain, oval, coloured leaves, which spread open and fall away. The flower has four oval petals which are less than the empalement; it has eight stamina which are the length of the petals, terminated by erect summits, and an oval germen with three or four lobes, supporting a short style, crowned by a single stigma. The germen afterward becomes one, two, or three globular berries, including nuts of the same form. There is rarely above one of these pregnant, the other are abortive.

This genus of plants is ranged in the third section of Linnæus's eighth class, which contains those plants whose flowers have eight stamina and three styles.

The SPECIES are,

1. SAPINDUS (*Saponaria*) foliis impari pinnatis, caule inermi. Lin. Sp. Plant. 526. *Sopeberry-tree with unequal winged leaves.* Sapindus foliis costæ alatæ inascensibus. Tourn. App. 659. *Sopeberry-tree with leaves growing from the wings of the midrib.*
2. SAPINDUS (*Rigidus*) foliis quaterno-pinnatis rigidis acutis. *Sopeberry-tree with winged leaves, which are composed of four stiff acute-pointed lobes.*
3. SAPINDUS (*Pinnatus*) foliis pinnatis supernè alternis, lobis ovato-oblongis. *Sopeberry-tree with winged leaves, whose upper lobes are placed alternate.*

The first sort grows naturally in the islands of the West-Indies, where it rises with a woody stalk from twenty to thirty feet high, sending out many branches toward the top, which are garnished with winged leaves, composed of three, four, or five pair of spear-shaped lobes, which are from three to four inches long, and an inch and a quarter broad in the middle, drawing to points at both ends. The midrib has a membranaceous or leafy border running on each side from one pair of lobes to the other, which is broadest in the middle between the lobes; they are of a pale green colour, and are pretty stiff; the flowers are produced in loose spikes at the end of the branches; they are small and white, so make no great appear-

ance. These are succeeded by oval berries as large as middling Cherries, sometimes single, at others two, three, or four are joined together; these have a saponaceous skin or cover which incloses a very smooth roundish nut of the same form, and of a shining black when ripe. These nuts were formerly brought to England for buttons to waistcoats, some were tipped with silver, and others with different metals; they were very durable, as they did not wear, and seldom broke. The skin or pulp which surrounds the nuts, is used in America to wash linen, but it is very apt to burn and destroy it, if often used, being of a very acrid nature.

The second sort was discovered by the late Dr. Houftoun, growing naturally at La Vera Cruz in New Spain; this hath a strong woody stalk which rises about twenty feet high, sending out many short, strong, ligneous branches, which are covered with a smooth gray bark, and are garnished with winged leaves, composed of two pair of spear-shaped lobes which are very stiff and smooth; the inner pair are small, being seldom more than an inch and a half long, and half an inch broad in the middle; the two outer lobes are near three inches long, and almost an inch broad in the middle, drawing to points at both ends; they are oblique to the foot-stalk, the midrib running much nearer to the border on one side; they are of a pale green, and sit close to the midrib, which has no border or wing like the other. The end of the branches are divided into two or three foot-stalks, each sustaining a loose spike of flowers like those of the other sort; these are succeeded by roundish berries like those of the former, but there are generally two, three, or four of them joined together.

The third sort grows naturally in India; this rises with a strait jointed stem to the height of twenty feet, sending out some lateral branches at the top, covered with a pale smooth bark, which are garnished with winged leaves composed of eight or ten pair of oblong oval lobes, each near four inches long, and an inch and a half broad at their base, of a light green colour, having very short foot-stalks; those on the lower part of the midrib are ranged opposite, but on the upper part of the midrib they are alternate, and always end with two lobes. As the plants have not as yet flowered in England, so I can give no farther account of them.

These plants are propagated by seeds (which must be obtained from the countries where they naturally grow, for they have not produced fruit in Europe;) the seeds must be put into small pots filled with rich fresh earth, and plunged into a hot-bed of tanners bark. The pots must be frequently watered, otherwise the berries, whose outer cover is very hard, will not vegetate. In five or six weeks the plants will appear, when the glasses of the hot-bed should be raised every day in warm weather to admit fresh air to the plants. In a month or six weeks after the plants appear they will be fit to transplant, when they must be shaken out of the pots, and carefully parted, so as not to injure their roots, and each planted into a separate small pot filled with light rich earth, and then plunged into the hot-bed again, observing to shade them from the sun every day until they have taken new root; after which time they must have free air admitted to them every day when the weather is warm, and will require to be frequently watered.

After the plants are well rooted, they will make great progress, so as to fill these pots with their roots in a few weeks time, therefore they should be shifted into larger pots, and as the plants advance, they should be inured to bear the open air by degrees; for if they are forced too much in summer, they seldom live thro' the winter, especially the first and second sorts, which are very subject to be lost in the first winter. I have frequently raised these plants from seeds to the height of two feet in one summer, and the leaves of these plants have been a foot and a half in length, so that they made a fine appearance; but these plants did not survive the winter, whereas those which were

exposed to the open air in July, and thereby stunted in their growth, continued their leaves fresh all the winter. These were placed in a stove upon shelves, where the warmth was very moderate, with which these plants will thrive better than in a greater heat. The third sort is much more hardy than either of the other: this may be placed in a good green-house in the autumn, where it will live through the winter, and in summer should be exposed to the open air in a sheltered situation, where it will thrive very well.

SAPONARIA. Lin. Gen. Plant. 449. Lychnis. Tourn. Inst. R. H. 333. tab. 175. Sopewort.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, which is cut into five points. It has five petals whose tails are narrow, angular, and the length of the empalement; their borders are broad, obtuse and plain. It has ten awl-shaped stamina the length of the tube of the flower, which are alternately inserted into the petals, and are terminated by obtuse prostrate summits, and a taper germen supporting two erect parallel styles, crowned by acute stigmas. The germen afterward becomes a close capsule the length of the empalement, having one cell filled with small seeds.

This genus of plants is ranged in the second section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and two styles.

The SPECIES are,

1. SAPONARIA (*Officinalis*) calycibus cylindricis, foliis ovato-lanceolatis. Hort. Cliff. 165. Sopewort with cylindrical empalements, and oval spear-shaped leaves. Lychnis sylvestris que saponaria vulgò. Tourn. Inst. 336. Wild Campion, vulgarly called Sopewort.
2. SAPONARIA (*Hybrida*) calycibus cylindricis, foliis ovatis nervosis semiamplexicaulibus. Sopewort with cylindrical empalements, and oval veined leaves half embracing the stalks. Lychnis saponaria dicta, folio convoluto. Raii Syn. 339. Campion, called Sopewort, with a twisted leaf.
3. SAPONARIA (*Vaccaria*) calycibus pyramidatis quinquangularibus, foliis oblongo-ovatis acuminatis sessilibus. Hort. Cliff. 166. Sopewort with pyramidal five-cornered empalements, and oblong, oval, acute-pointed leaves. Lychnis fegetum rubra, foliis perfoliata. C. B. P. 204. Red Corn Campion, with Thorough-wax leaves.
4. SAPONARIA (*Amplicimus*) calycibus pyramidatis quinquangularibus, foliis ovato-lanceolatis, semiamplexicaulibus. Sopewort with pyramidal five-cornered empalements, and oval spear-shaped leaves, half embracing the stalks. Lychnis fegetum rubra, foliis perfoliata amplioribus. Juss. Red Corn Campion, with larger Thorough-wax leaves.
5. SAPONARIA (*Orientalis*) calycibus cylindricis villosis, caule dichotoma erecto patulo. Hort. Upsal. 106. Sopewort with cylindrical hairy empalements, and erect spreading stalks which are divided by pairs. Lychnis Orientalis annua supina, antirrhini folio, flore minimo purpurascens. Tourn. Cor. 25. Low annual Eastern Sopewort, with a Snap-dragon leaf, and the least purplish flower.

The first sort is the common Sopewort of the shops; this grows naturally in many parts of England, and is rarely admitted into gardens; it has a creeping root which spreads far on every side, so as in a short time to fill a large space of ground, from which arise many purplish stalks about a foot and a half high, which are jointed, and garnished with opposite leaves at each; these are oval, spear-shaped, and smooth, about three inches long, and an inch and a half broad, ending in points; they have three longitudinal veins on their under side, and are of a pale green. The foot-stalks of the flowers arise from the wings of the leaves opposite they sustain four, five, or more purplish flowers each, which have generally two small leaves placed under them. The stalk is also terminated by a loose bunch of flowers growing in form of an umbel; they have each a large swelling cylindrical empalement, and five broad obtuse petals which spread open, and are of a purple colour. These appear in

July, and are succeeded by oval capsules with one cell, filled with small seeds.

The leaves of this plant are sometimes used in medicine; they are accounted opening and attenuating, and somewhat sudorific, so are by some recommended against the lues venerea, and outwardly applied they help hard tumours and whitloes. The decoction of this plant is used to cleanse and scour woolen cloths: the poor people in some countries use it instead of sope for washing, from whence it had its title.

There is a variety of this with double flowers, which is preserved in gardens, but the roots are very apt to spread far on every side if they are not confined, so these plants should not be placed in borders among better flowers; but as the flowers continue in succession from July to the middle of September, so a few of the plants may be allowed a place in some abject part of the garden, for they will thrive in any situation, and propagate fast enough by their creeping roots.

The second sort was found growing in a wood near Lichbarrow in Northamptonshire, by Mr. Gerard. It has been generally esteemed a lusus naturæ, and not a distinct species, but I have never found it alter in forty years; but as it doth not produce seeds, so there is no certainty of its being a distinct species. The roots of this do not spread like those of the first, the stalks are shorter, thicker, and do not grow so erect; they rise a foot or more in height, the joints are very near and swelling; the leaves are produced singly on the lower part of their stalks, but toward the top they are often placed by pairs; they are oval-shaped, about three inches long and two broad, having several longitudinal veins or plaits, and are hollowed like a ladle. The flowers are disposed loosely on the top of the stalk, they have large cylindrical empalements; they are of one petal, and scarce any visible stamina; they are of a purple colour, and flower in July. This plant is preserved for the sake of variety in some gardens, but as there is little beauty in the flowers, it does not merit a place in gardens for pleasure. It is easily propagated by parting of the roots in autumn, and loves a moist shady situation.

The third sort is an annual plant, which grows naturally among Corn in the south of France and Italy. This rises with an upright stalk near a foot and a half high, branching out upward into several divisions; these always are by pairs opposite, as are also the leaves, which are about an inch and a half long, and half an inch broad at their base, ending in acute points; they sit close to the stalks, are smooth, and of a gray colour. The flowers are produced at the end of the branches, each standing upon a long naked foot-stalk; their empalements are large, swelling, and pyramidal, having five acute corners or angles; the petals are but small; they have long necks or tails, which are narrow; their upper part is obtuse, and of a reddish purple colour. These appear in June and July, and the seeds ripen in autumn.

The fourth sort grows naturally in Spain; this is also an annual plant; it rises with a strong smooth stalk about two feet high, garnished with oval spear-shaped leaves three inches long, and an inch and a half broad near their base, drawing to a point at the end; they are fleshy, of a gray colour, and are very smooth; they are placed by pairs, and half embrace the stalks with their base; the upper part of the stalk divides into many branches, which are again subdivided into long naked foot-stalks, each sustaining a single flower; the empalement of the flower is large, pyramidal, and swelling, having five acute angles. The flowers are composed of five obtuse red petals, which spread open flat above the empalement. These appear in June and July, and the seeds ripen in autumn.

The fifth sort grows naturally in the Levant, from whence Dr. Tournefort sent the seeds. This is a low annual plant, seldom rising more than four inches high.

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high, but divides into branches by pairs from the bottom, which spread afunder. The leaves are very small, the flowers come out single from the wings of the leaves; they have hairy cylindrical empalements, out of which the petals of the flower do but just peep, so are not obvious at any distance. The whole plant is very clammy to the touch. As this plant makes no figure, so it is only kept for variety.

These plants are easily propagated by seeds, which should be sown where the plants are to remain, and will require no other care but to keep them clean from weeds, and thin them where they are too close. If the seeds are sown in autumn, or are permitted to scatter, the plants will come up without care.

SAPOTA. Plum. Nov. Gen. 43. tab. 4. Acras. Lin. Gen. Plant. 438. The Mammée Sapota.

The CHARACTERS are,

The flower has a permanent empalement composed of five oval leaves, which are acute-pointed and erect. It has five roundish heart-shaped petals, which are connected at their base, and end in acute points; and six short stamina the length of the tube, terminated by arrow-pointed summits, with an oval germen supporting a short style, crowned by an obtuse stigma. The germen afterward becomes an oval succulent fruit, inclosing one or two oval hard nuts or stones.

This genus of plants is ranged in the first section of Linnæus's sixth class, which includes those plants whose flowers have six stamina and one style.

The SPECIES are,

1. SAPOTA (*Acras*) foliis oblongo-ovatis, fructibus turbinatis glabris. *Sapota with oblong oval leaves, and smooth turbinated fruit.* Sapota fructu turbinato minori. Plum. Nov. Gen. 43. *Sapota with a smaller turbinated fruit.*
2. SAPOTA (*Mammosa*) foliis lanceolatis, fructu maximo ovato, feminibus ovatis utrinque acutis. *Sapota with spear-shaped leaves, a very large oval fruit, and oval seeds which are pointed at both ends.*

The name of Sapota is what these fruit are called by the natives of America, to which some add the appellation of Mammée; but there is no other name given to these fruits by the English, since they have settled in the West-Indies, so far as I can learn.

The first of these trees is common about Panama, and some other places in the Spanish West-Indies, but is not to be found in many of the English settlements in America. The second sort is very common in Jamaica, Barbadoes, and most of the islands in the West-Indies, where the trees are planted in gardens for their fruit, which is by many persons greatly esteemed.

The second sort grows in America to the height of thirty-five or forty feet, having a strait trunk, covered with an Ash-coloured bark. The branches are produced on every side, so as to form a regular head; these are beset with leaves, which are a foot in length, and near three inches broad in the middle, drawing to a point at each end. The flowers which are produced from the branches, are of a cream colour; when these fall away, they are succeeded by large oval or top-shaped fruit, which are covered with a brownish skin, under which is a thick pulp of a russet colour, very luscious, called natural marmelade, from its likeness to marmelade of Quinces.

As these trees are natives of very warm countries, they cannot be preserved in England, unless they are placed in the warmest stoves and managed with great care. They are propagated by planting the stones, but as these will not keep good long out of the ground, the surest method to obtain these plants is, to have the stones planted in tubs of earth, as soon as they are taken out of the fruit, and the tubs placed in a situation where they may have the morning sun, and kept duly watered. When the plants come up, they must be secured from vermin and kept clear from weeds, but should remain in the country till they are about a foot high, when they may be shipped for England; but they should be brought over in the summer, and, if possible, time enough for the plants to

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make good roots after they arrive. During their passage they must have some water, while they continue in a warm climate; but as they come into colder weather, they should have very little moisture; and they must be secured from salt water, which will soon destroy the plants if it gets at them.

When these plants arrive in England, they should be carefully taken out of the tubs, preserving some earth to their roots, and planted into pots filled with fresh earth, and then plunged into a moderate hot-bed of tanners bark, observing, if the weather is hot, to shade the glasses with mats every day, to screen the plants from the sun, until they have taken new root; observing also not to water them too much at first, especially if the earth in which they come over is moist; because too much water is very injurious to the plants before they are well rooted, but afterward they must be frequently refreshed with water in warm weather; and they must have a large share of air admitted to them, otherwise their leaves will be infested with insects and become foul; in which case they must be washed with a sponge to clean them, without which the plants will not thrive.

In the winter these plants must be placed in the warmest stove, and in cold weather they should have but little water given to them, though they must be frequently refreshed when the earth is dry; especially if they retain their leaves all the winter, they will require a greater share of water than when they drop their leaves; so that this must be done with discretion, according to the state in which the plants are. As these plants grow in magnitude, they should be shifted into pots of a larger size, but they must not be over-potted, for that will infallibly destroy them.

SARRACENA. Tourn. Inst. R. H. 657. tab. 476. Lin. Gen. Plant. 578. The Sidesaddle-flower.

The CHARACTERS are,

The flower has a double empalement; the under is composed of three small oval leaves which fall away; the upper has five large coloured leaves, which are permanent. It has five oval inflexed petals which inclose the stamina, whose tails are oblong, oval, and erect, and a great number of small stamina, terminated by target-shaped summits. In the center is situated a roundish germen, supporting a short cylindrical style, crowned by a target-shaped five-cornered stigma covering the stamina, and is permanent. The germen afterward becomes a roundish capsule with five cells, filled with small seeds.

This genus of plants is ranged in the first section of Linnæus's thirteenth class, which includes those plants whose flowers have many stamina and one style.

The title of this genus was given to it by Dr. Tournefort, in honour of Dr. Sarrazin, a curious botanist, who sent this and many other rare plants from Canada to the Paris Garden.

The SPECIES are,

1. SARRACENA (*Purpurea*) foliis gibbis. Hort. Cliff. 427. *Sarracena with gibbous leaves.* Sarracena Canadensis, foliis cavis & auritis. Tourn. Inst. R. H. 657. *Sarracena of Canada, with hollowed and eared leaves.*
2. SARRACENA (*Flava*) foliis strictis. Lin. Sp. Plant. 510. *Sarracena with closed leaves.* Sarracena foliis longioribus & angustioribus. Catesb. Hist. Carol. 2. p. 69. *Sarracena with longer and narrower leaves.*

The first sort grows naturally upon bogs in most parts of North America; this hath a strong fibrous root, which strikes deep into the soft earth, from which arise five, six, or seven leaves, in proportion to the strength of the plant; these are about five or six inches long, hollow like a pitcher, narrow at their base, but swell out large at the top; their outer sides are rounded, but on their inner side they are a little compressed, and have a broad leafy border running longitudinally the whole length of the tube; and to the rounded part of the leaf there is on the top a large appendage or ear standing erect, of a brownish colour; this surrounds the outside of the leaves about two thirds of the top, it is eared at both ends, and waved round the border. From the center of the root, between the leaves, arises a strong, round, naked

ked foot-stalk about a foot high, sustaining one nodding flower at the top, which has a double empalement; the outer one is of one leaf, divided into five parts to the bottom, where they are connected to the foot-stalks; these segments are obtuse and bent over the flower, so as to cover the inside of it; they are of a purple colour on the outside, but green within, having purple edges; the inner empalement, which is composed of three green leaves, falls off; within these are five oval petals of a purple colour, which are hollowed like a spoon; these cover the stamina and summits, with part of the stigma also. In the center is situated a large, roundish, channelled germen, supporting a short style, crowned by a very broad five-cornered stigma, fastened in the middle to the style, and covering the stamina like a target; this is green, and the five corners which are stretched out beyond the brim are each cut into two points, and are purplish. Round the germen are situated a great number of short stamina, joining the sides of the germen closely, which are terminated by target-shaped furrowed summits, of a pale sulphur colour. When the flower decays, the germen swells to a large roundish capsule with five cells, covered by the permanent stigma, and filled with small seeds. It flowers in June, and the seeds ripen in autumn.

The second sort grows naturally in Carolina, upon bogs and in standing shallow waters. The leaves of this sort grow near three feet high, being small at the bottom, but widening gradually to the top. These are hollow, and are arched over at the mouth like a friar's cowl. The flowers of this grow on naked pedicles, rising from the root to the height of three feet; these flowers are green.

These plants are esteemed for the singular structure of their leaves and flowers, which are so different from all the known plants, as to have little resemblance of any yet discovered; but there is some difficulty in getting them to thrive in England, when they are obtained from abroad; for as they grow naturally on bogs, or in shallow standing waters, so unless they are constantly kept in wet, they will not thrive; and although the winters are very sharp in the countries where the first sort naturally grows, yet being covered with water and the remains of decayed plants, they are defended from frost.

The best method to obtain these plants is, to procure them from the places of their natural growth, and to have them taken up with large balls of earth to their roots, and planted in tubs of earth; which must be constantly watered during their passage, otherwise they will decay before they arrive; for there is little probability of raising these plants from seeds, so as to produce flowers in many years, if the seeds do grow; so that young plants should be taken up to bring over, which are more likely to stand here, than those which have flowered two or three times. When the plants are brought over, they should be planted into pretty large pots, which should be filled with soft spongy earth, mixed with rotten wood, Moss, and turf, which is very like the natural soil in which they grow. These pots should be put into tubs or large pans which will hold water, with which they must be constantly supplied, and placed in a shady situation in summer; but in the winter they must be covered with Moss, or sheltered under a frame, otherwise they will not live in this country; for as the plants must be kept in pots, so if these are exposed to the frost, it will soon penetrate through them, and greatly injure, if not destroy the plants; but when they are placed under a common frame, where they may have the open air at all times in mild weather, and be sheltered from hard frost, the plants will thrive and flower very well.

SASSAFRAS. See LAURUS.

SATUREJA. Tourn. Inst. R. H. 197. Thymbra. Tourn. Inst. 197. Lin. Gen. Plant. 626. [so called, because said to cause a satyriasmus, or priapismus, this herb exciting greatly to venery.] Savory; in French, *Sarriette*.

The CHARACTERS are,

The flower hath an erect, tubulous, striated, permanent empalement of one leaf, indented at the brim in five points; it hath one ringent petal, whose tube is cylindrical and shorter than the empalement; the chaps are single, the upper lip erect and obtuse, having an acute indenture at the point. The under lip is spreading, divided into three parts, which are nearly equal. It has four bristly stamina, two of which are almost the length of the upper lip; the other two are shorter, terminated by summits which touch each other, and a four-pointed germen supporting a bristly style, crowned by two bristly stigmas. The germen afterward become four seeds, which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which contains those plants whose flowers have two long and two shorter stamina, and the seeds are naked in the empalement.

The SPECIES are,

1. SATUREJA (*Hortensis*) pedunculis bifloris. Vir. Cliff. 87. Savory with two flowers upon each foot-stalk. Satureja sativa. J. B. 3. 272. Garden, or Summer Savory.
2. SATUREJA (*Thymbra*) verticillis subrotundis hispidis, foliis oblongis acutis. Flor. Leyd. Prod. 324. Savory with whorled flowers, and oblong acute-pointed leaves. Thymbra legitima. Clus. Hist. 1. p. 358. The true Thymbra.
3. SATUREJA (*Montana*) pedunculis dichotomis lateralibus solitariis, foliis lineari-lanceolatis mucronatis. Lin. Sp. Plant. 568. Savory with single diverging foot-stalks on the sides of the branches, and linear spear-shaped leaves. Satureja montana. C. B. P. 218. Mountain, or Winter Savory.
4. SATUREJA (*Virginiana*) capitulis terminalibus, foliis lanceolatis. Lin. Sp. Plant. 567. Savory with heads of flowers terminating the stalks, and spear-shaped leaves. Clinopodium pulegii angusto rigidoque folio, Virginianum, flosculis in cymis dispositis. Pluk. Alm. 110. tab. 54. fig. 2. Virginian Field Basil with a stiff, narrow, Pennyroyal leaf, and flowers disposed on the tops of the stalks.
5. SATUREJA (*Origanoides*) foliis ovatis ferratis, corymbis terminalibus dichotomis. Lin. Sp. Plant. 568. Savory with oval sawed leaves, and flowers growing in a divided corymbus, terminating the stalks. Calamintha erecta, Virginiana, mucronato folio glabro. Mor. Hist. 3. p. 413. Upright Virginian Field Basil, with a smooth acute-pointed leaf.
6. SATUREJA (*Juliana*) verticillis fastigiatis concatenatis foliis lineari-lanceolatis. Lin. Sp. Plant. 567. Savory with bunched whorls of flowers, and linear spear-shaped leaves. Thymbra sancti Juliani sive satureja verior. Lob. Icon. 245. St. Julian's Thymbra, or the true Savory.
7. SATUREJA (*Græca*) pedunculis corymbosis lateralibus geminis, bracteis calyce brevioribus. Lin. Sp. Plant. 568. Savory with corymbuses of flowers upon foot-stalks, growing by pairs from the wings of the leaves, and bractes shorter than the empalements. Clinopodium Creticum. Alp. Exot. 265. Cretan Field Basil.
8. SATUREJA (*Capitata*) floribus spicatis, foliis carinatis punctatis ciliatis. Lin. Mat. Med. 283. Savory with spiked flowers, and keel-shaped hairy leaves having spots. Thymum legitimum. Clus. Hist. 1. p. 375. The legitimate Thyme.

The first sort is generally known in the gardens by the title of Summer Savory. This is an annual plant, which grows naturally in the south of France and in Italy, but it is cultivated in the English gardens for the kitchen, and also for medicinal use. It rises with slender erect stalks about a foot high, sending out branches at each joint by pairs, which are garnished with leaves placed opposite, which are about an inch long, and one eighth of an inch broad in the middle; they are stiff, a little hairy, and have an aromatic odour if rubbed. The flowers grow from the wings of the leaves toward the upper part of the branches, each foot-stalk sustaining two flowers, which are of the lip kind, having a short cylindrical tube; the upper lip is erect and indented at the point; the lower

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is divided into three almost equal parts; they are of a pale flesh colour, and appear in July, and the seeds ripen in autumn.

The second sort grows naturally in Crete; this rises with a shrubby stalk about two feet high, dividing into several slender ligneous branches, which are garnished with small, stiff, oval leaves, ending in acute points, which emit an aromatic odour when bruised. The flowers grow in thick whorls round the stalks toward the top; they have short, hairy, five-pointed empalements; the tube of the petal is longer than the cup, and the flower is shaped like that of the former, but it is larger and of a brighter red colour. This plant flowers in June, July, and August, but rarely ripens its seeds in England.

The third sort is well known in the gardens by the title of Winter Savory; this is a perennial plant, which grows naturally in the south of France and Italy, but is here cultivated in gardens both for food and physic. This hath a shrubby, low, branching stalk; the branches rise about a foot high; they are ligneous, and are garnished with two very narrow leaves about an inch long at each joint; they are stiff, and stand opposite; from the base of these come out a few small leaves in clusters. The flowers grow from the wings of the leaves upon short foot-stalks; they are shaped like those of the first sort, but are larger and of a paler colour. These appear in June, and are succeeded by seeds which ripen in autumn, but the plants will continue several years, especially if they are planted in a poor dry soil.

The fourth sort grows naturally in North America; this hath a perennial root, but the stalk is annual, and rises about a foot and a half high; it is stiff, angular, and branches out toward the top. The leaves are stiff, spear-shaped, and pointed; they are about an inch and a half long, and a quarter of an inch broad in the middle, pointed at both ends, and have a strong scent of Pennyroyal; the stalks are terminated by white flowers collected into globular heads. These appear in July, but are seldom succeeded by seeds in England.

The sixth sort grows naturally in Spain and some parts of Italy; this hath very slender ligneous stalks which grow erect, about nine inches high, sending out two or three slender side branches toward the bottom; these are garnished with narrow, spear-shaped, stiff leaves, which are placed opposite. The flowers grow in whorls above each other for more than half the length of the stalk, they seem as if they were bundled together. The flowers are small and white; they appear in July, but the seeds seldom ripen here; the whole plant has a pleasant aromatic scent.

The seventh sort grows naturally in Crete; this hath very slender ligneous stalks, which rise near a foot and a half high, garnished with small, oval, stiff, acute-pointed leaves, whose borders are reflexed. The flowers grow in roundish whorls upon foot-stalks, which rise by pairs from the wings of the leaves; these are small and white; they appear in July, and if the season proves warm, the seeds will ripen in autumn.

The eighth sort grows naturally in Crete; this has a low shrubby stalk, which sends out branches on every side, which grow about six inches long, and are hoary; they are garnished with stiff, narrow, acute-pointed leaves, which are hollowed like the keel of a boat. The flowers grow in short roundish spikes at the end of the branches; they are small and white; the whole plant is hoary, and very aromatic. This never produces seeds in England.

The first sort is only cultivated by seeds; these should be sown the beginning of April, upon a bed of light earth, either where they are to remain, or for transplanting; if the plants are to stand unremoved, the seeds should be sown thinly; but if they are to be transplanted, they may be sown closer. When the plants appear they must be kept clean from weeds, and afterward they may be treated in the same way as Marjoram.

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The second, sixth, and eighth sorts, are too tender to live through the winter in the open air in England. These are generally propagated by slips or cuttings, which take root very readily during any of the summer months; if these cuttings or slips are planted in a shady border, or are shaded from the sun with mats, they will put out roots in two months, fit to be transplanted, when they should be taken up carefully, and each transplanted into a small pot, filled with fresh undunged earth, and placed in the shade till they have taken new root; then they may be placed in a sheltered situation, where they may remain till the end of October, when they should be placed under a common hot-bed frame, where they may be exposed to the open air at all times when the weather is mild; but they must be protected from hard frost, which will destroy them if exposed thereto.

As these plants seldom live above three or four years, so there should be a supply of young plants raised to preserve the species, otherwise they may be soon lost. In winter they should not have much wet, for they are very subject to grow mouldy by moisture, but especially if the free air is excluded from them; or if their branches are drawn up weak, they are very apt to get mouldy, and then they soon decay.

The third sort is very hardy, so if this is sown or planted upon a dry lean soil, it will endure the greatest cold of our winters. I have seen some of the plants growing upon the top of an old wall, where they were fully exposed to the cold, and these survived the severe frost, when most of those which were growing in the ground were destroyed. This may be propagated either by seeds in the same way as the first sort, or by slips, which, if planted in the spring, will take root very freely. These plants will last several years, but when they are old, their shoots will be short and not so well furnished with leaves, so will not be so good for use as young plants, therefore it will be proper to raise a supply of young plants every other year.

The fifth sort has a perennial root, but the stalks decay every autumn. There are two varieties of this, one of them has narrower leaves and larger heads than the other, and the leaves have very little scent; whereas those of the common sort smell so like Pennyroyal, as not to be distinguished by those who do not see the plants. This sort sometimes produces good seeds here, from which the plants may be easily propagated; they may also be increased by planting cuttings in the spring, in the same manner as is practised for Mint; these will take root freely, and if they are afterwards planted in a moist soil, they will thrive exceedingly; but as the plant is never used here, so it is only kept for variety in some curious gardens.

SATYRIUM. Lin. Gen. Plant. 901. Orchis, Tourn. Inst. R. H. 431. tab. 247, 248.

The CHARACTERS are,

It hath a single stalk; the flowers have no empalement, but sit upon the germen: they have five oblong oval petals, three outer and two inner, rising and joined in a helmet; they have a one-leaved nectarium, situated on the side between the division of the petals, fastened to the receptacle. The upper lip is short and erect, the under is plain and hangs downward, their base represents the hinder part of the scrotum. They have two short slender stamina sitting upon the pointal, having oval summits which have double cells shut in the upper lip of the nectarium, and an oblong twisted germen situated under the flower, having a short style, growing on the upper lip of the nectarium, crowned by an obtuse compressed stigma. The germen afterward becomes an oblong capsule with one cell, having three keels and three cells, opening under the keels three ways, and filled with small seeds.

This genus of plants is ranged in the first section of Linnæus's twentieth class, which includes those plants in whose flowers the stamina are connected to the style.

The SPECIES are,

1. SATYRIUM (*Nigrum*) bulbis palmatis, foliis linearibus, floribus resupinatis nectarii labio indiviso ovato acuminato

acuminato. Act. Upsal. 1740. p. 19. *Satyrium with banded bulbs, linear leaves, the flowers oval, bending downward, and the nectarium undivided.* Orchis palmata angustifolia Alpina, nigro flore. C. B. P. 86. *Narrow-leaved banded Orchis of the Alps, with a black flower.*

2. SATYRIUM (*Hirsinum*) bulbis indivisis, foliis lanceolatis, nectarii labio trifido, intermedia lineari, obliqua præmorfa. Act. Upsal. 1740. tab. 18. *Satyrium with an undivided bulb, spear-shaped leaves, and the lip of the nectarium trifid, the middle segment being linear and obliquely bitten.* Orchis barbata fœtida. J. B. P. 2. p. 756. *The Lizard-flower, or Great Goat-stones.*

3. SATYRIUM (*Viride*) bulbis palmatis, foliis oblongis obtusis, nectarii labio lineari trifido, intermedia obsoleta. Act. Upsal. 1740. p. 18. *Satyrium with banded bulbs, oblong blunt leaves, and the lip of the nectarium divided into three linear parts, the middle one being obsolete.* Orchis palmata minor, flore luteo viridi. Raii Syn. 11. 239. *Smaller banded Orchis with a green flower, by some called the Frog Orchis.*

4. SATYRIUM (*Albidum*) bulbis fasciculatis, foliis lanceolatis, nectarii labio trifido, acuto, intermedia majore. Act. Upsal. 1740. *Satyrium with clustered bulbs, spear-shaped leaves, and the lip of the nectarium divided into three acute parts, the middle one being the largest.* Orchis palmata Alpina, -spicâ densa albo-viridi. Haller. Helv. 68. *Alpine banded Orchis, with a thick close spike of whitish green flowers.*

The first sort grows naturally upon the Alps; this has a broad, banded, bulbous root; the stalk rises about nine inches high, and is garnished with very narrow leaves; those on the lower part are about four inches long, but on the upper part they are scarce one inch; their base embraces the stalk. The flowers grow in a thick short spike at the top, they are of a dark purple colour; the lip of the nectarium has three lobes, the middle one being the largest. This flowers the beginning of June.

The second sort grows naturally in several parts of England; this has a solid bulbous root, which is not divided; the stalk is strong, and rises fifteen inches high; the lower part is garnished with leaves near five inches long and half an inch broad, which embrace the stalk with their base. The spike of flowers which occupy the upper part of the stalk, is six inches in length; the flowers are of a dirty white, with some linear stripes and spots of a brown colour; the beard or middle segment of the lip of the nectarium is two inches long, and appears as if it was obliquely bitten off. It flowers the latter end of June.

The third sort grows naturally on dry pastures, and upon chalk hills in several parts of England. This has a banded bulbous root; the stalk rises near a foot high; the lower part is garnished with leaves three inches long and half an inch broad, whose bases embrace the stalk. The flowers grow in a long slender spike on the top of the stalk; the nectarium of this varies in colour, it is sometimes of a dusky purple, and at others of a yellowish green colour. It flowers the latter end of May, or the beginning of June.

The fourth sort grows near Verona, and upon the Alps. This hath several small bulbs which are joined together; the stalk rises about eight inches high, the lower part is garnished with spear-shaped leaves about three inches long, which embrace the stalk with their base. The flowers are collected in a short thick spike on the top of the stalk, which are of an herbaceous white colour. This flowers in June.

All these plants are difficult to propagate, so the best way to obtain them is to take up their roots at a proper season, and transplant them into the gardens, putting the several sorts into different soils, as near to that in which they naturally grow as possible, and to leave the ground undisturbed; for if their roots are injured, the plants seldom thrive after. The management of this plant being the same as for the Orchis, I shall not repeat it here.

SAVINE. See JUNIPERUS.

SAVORY. See SATUREJA.

SAURURUS. Lin. Gen. Plant. 414. Lizard's-tail.

The CHARACTERS are,

The flowers are disposed into a katkin or tail; they have an oblong permanent empalement of one leaf, coloured on the side. They have no petal, but have six long hair-like stamina, placed three on each side opposite, terminated by oblong erect summits, and an oval germen with three lobes having no style, but is crowned by three blunt permanent stigmas. The germen afterward becomes an oval berry with one cell, inclosing one oval seed.

This genus of plants is ranged in the third section of Linnæus's seventh class, which includes those plants whose flowers have seven stamina, and three styles or stigmas.

We have but one SPECIES of this genus at present in the English gardens, viz.

SAURURUS (*Cernuus*) foliis cordatis petiolatis, amenitis foliariis recurvis. Hort. Upsal. 91. *Lizard's-tail with heart-shaped leaves having foot-stalks, and single recurved spikes of flowers.* Serpentaria repens, floribus stamineis spicatis, bryoniæ nigræ folio ampliore pingui, Virginienfis. Pluk. Alm. 343. *Creeping Snake-wort of Virginia, with spiked stameneous flowers, and a large, fat, black, Briony leaf.*

This plant grows naturally in most parts of North America. The root is fibrous and perennial; the stalks generally trail upon the ground, so seldom rise more than two feet high, having some longitudinal furrows; the leaves are heart-shaped and smooth; they are about three inches long, and two broad at their base, ending in obtuse points, and have several longitudinal veins which join at the foot-stalk, but diverge from the midrib toward the borders in the middle, and join again at the point; these stand upon foot-stalks about an inch long, which are placed alternately on the stalk. The spike of flowers comes out from the wings of the leaves toward the top of the stalk, which is taper, and about two inches long; these appear in July, but make but little appearance, and are not succeeded by seeds in England. The stalk decays in autumn.

This is preserved in botanic gardens for the sake of variety; but, as it has no beauty, it is very rarely admitted into other gardens; it is propagated by parting of the root, which may be performed either in autumn, soon after the stalks decay, or in the spring, before the roots begin to shoot; it loves a moist soil and a shady situation.

The other plants, which in the former editions of this work were placed in this genus, are now removed to the genus of PIPER.

SAXIFRAGA. Tourn. Inst. R. H. 252. tab. 129. Lin. Gen. Plant. 464. [so called, q. saxa stones, and frangens, Lat. breaking, because, as Bauhinus says, the juice of it being drank, breaks the stone in the reins and bladder, but the truth of it is doubted. Others derive it from its growing on stony mountains, as growing out of the clefts of the stones.] Saxifrage.

The CHARACTERS are,

The flower hath a short, permanent, acute empalement of one leaf, cut into five segments; it has five plain petals, which are longer than the empalement, and ten awl-shaped stamina, terminated by roundish summits, with a roundish acute-pointed germen sitting upon two styles, crowned by obtuse stigmas. The germen afterward becomes an oval capsule with two horns opening between their tops, and filled with small seeds.

This genus of plants is ranged in the second section of Linnæus's tenth class, which contains those plants whose flowers have ten stamina and two styles.

The SPECIES are,

1. SAXIFRAGA (*Granulata*) foliis caulinis reniformibus lobatis, caule ramoso radice granulata. Hort. Cliff. 167. *Saxifrage with leaves upon the stalks which are kidney-shaped, and have lobes, a branching stalk, and roots like grains of Corn.* Saxifraga rotundifolia, alba. C. B. P. 339. *Round-leaved white Saxifrage.*

2. SAXIFRAGA (*Cotyledon*) foliis radice aggregatis lingulatis cartilagineo-ferratis, caule paniculato. Lin. Sp. 570. *Saxifrage with tongue-shaped leaves at the root, which*

which are joined together, and have cartilaginous saws, and a panicle stalk. *Saxifraga folio fedi angustiore, ferrato*. Tourn. Inst. R. H. 252. *Saxifrage with a narrow Houseleek leaf, which is sawed on its edges.*

3. *SAXIFRAGA (Paniculata)* foliis radicans aggregatis cuneiformibus cartilagineo-ferratis, caule paniculato. *Saxifrage with the lower leaves wedge-shaped and joined together, with edges having cartilaginous saws, and a paniculated stalk.* *Saxifraga foliis subrotundis ferratis*. Tourn. Inst. 252. *Saxifrage with roundish sawed leaves.*
4. *SAXIFRAGA (Pyramidata)* foliis radicans aggregatis lingulatis, cartilagineo-ferratis, caule pyramidato. *Saxifrage with the lower leaves joined together, which are tongue-shaped, and have cartilaginous saws, and a pyramidal stalk.* *Saxifraga montana, pyramidata, folio longiore*. Tourn. Inst. R. H. 253. *Mountain pyramidal Saxifrage, with a longer leaf.*
5. *SAXIFRAGA (Rotundifolia)* foliis caulinis dentatis reniformibus petiolatis. Lin. Sp. Plant. 403. *Saxifrage with kidney-shaped leaves on the stalks, which are indented and have foot-stalks.* *Geum rotundifolium majus*. Tourn. Inst. 251. *Greater round-leaved Kidneywort.*
6. *SAXIFRAGA (Hirsuta)* foliis reniformibus dentatis, caule nudo paniculato. Lin. Sp. Plant. 401. *Saxifrage with indented kidney-shaped leaves, and a naked paniculated stalk.* *Geum folio circinato, pistillo floris pallido*. Tourn. Inst. R. H. 251. *Round-leaved Kidneywort, with a pale pointal to the flower.*
7. *SAXIFRAGA (Punctata)* foliis obovatis dentatis petiolatis, caule nudo paniculato. Lin. Sp. Plant. 401. *Saxifrage with oblong, oval, indented leaves having foot-stalks, and a naked paniculated stalk.* *Geum folio subrotundo majore, pistillo floris rubro*. Tourn. Inst. R. H. 251. *Greater roundish-leaved Kidneywort, with a red pointal to the flower, commonly called London Pride, or None-so-pretty.*
8. *SAXIFRAGA (Pennsylvanica)* foliis lanceolatis denticulatis, caule nudo paniculato, floribus subcapitatis. Lin. Sp. Plant. 399. *Saxifrage with spear-shaped indented leaves, a naked paniculated stalk, and flowers collected in heads.* *Saxifraga Pennsylvanica, floribus muscosis racemosis*. Hort. Elth. 337. *Saxifrage of Pennsylvania, with branching mossy flowers.*
9. *SAXIFRAGA (Nivalis)* foliis obovatis crenatis subsessilibus, caule nudo, floribus congestis. Lin. Sp. Plant. 401. *Saxifrage with oblong, oval, crenated leaves sitting close to the root, a naked stalk, and flowers growing in close bunches.* *Saxifraga foliis oblongo-rotundis dentatis, floribus compactis*. Raii Syn. 3. 354. *Saxifrage with oblong, round, indented leaves, and compact flowers.*
10. *SAXIFRAGA (Autumnalis)* foliis caulinis linearibus alternis ciliatis, radicalibus aggregatis. Lin. Sp. Plant. 402. *Saxifrage with linear leaves on the stalk which are set with fine hairs, are alternate, and those at the root joined together.* *Geum angustifolium autumnale, flore luteo guttato*. Tourn. Inst. 252. *Narrow-leaved autumnal Kidneywort, with a yellow spotted flower.*
11. *SAXIFRAGA (Oppositifolia)* foliis caulinis ovatis oppositis imbricatis, summis ciliatis. Flor. Suec. 359. *Saxifrage with oval leaves on the stalks which are opposite, which lie over each other, and upper leaves having fine hairs.* *Sedum Alpinum ericoides purpurascens*. C. B. P. 284. *Alpine purplish Houseleek like Heath.*
12. *SAXIFRAGA (Hypnoides)* foliis caulinis linearibus integris trifidisve, stolonibus procumbentibus, caule erecto nudiuscula. Lin. Sp. Plant. 405. *Saxifrage with linear leaves on the stalks which are entire or trifid, trailing side-shoots, and erect stalks which are almost naked.* *Saxifraga muscosa trifido folio*. Tourn. Inst. 252. *Mossy Saxifrage with a trifid leaf, or Mountain Sea-green with jagged leaves, commonly called Ladies Cushion.*

There are many more species of this genus than are here enumerated, some of which grow naturally in Great-Britain; but, as they are very rarely admitted into gardens, it would be needless to mention them all in this work.

The first sort is the common white Saxifrage, which grows naturally in the meadows in most parts of England. The roots of this plant are like grains of Corn,

of a reddish colour without, from which arise kidney-shaped hairy leaves, standing upon pretty long foot-stalks. The stalks are thick, a foot high, hairy, and furrowed on two sides; these branch out from the bottom, and have a few small leaves like those below, which sit close to the stalks; the flowers terminate the stalk, growing in small clusters; they have five small white petals, inclosing ten stamina and the two styles. It flowers in April: the roots and leaves of this plant are used in medicine.

There is a variety of this which was found wild by Mr. Joseph Blind, gardener at Barnes, who transplanted it into his garden, and afterward distributed it to several curious persons, since which time it has been multiplied so much, as to become a very common plant in most gardens near London, where it is commonly planted in pots to adorn court-yards, &c. in the spring, and is very ornamental at that season in the borders of the flower-garden.

This plant is propagated by offsets, which are sent forth from the old roots in great plenty. The best season for transplanting them is in July, after their leaves are decayed, when they must be put into fresh undunged earth, and placed in the shade until autumn; but in winter they may be exposed to the sun, which will cause them to flower somewhat earlier in the spring. In April these plants will flower, and, if they are in large tufts, will at that time make a very handsome appearance; for which reason most people suffer them to remain three or four years unremoved, and when they are transplanted, always plant them in bunches, that they may produce a greater number of flowers. If these plants are put into the full ground, they must have a shady situation, otherwise they will not thrive.

The second sort grows naturally on the Alps; this hath a perennial fibrous root. The leaves grow round in circular heads, embracing each other at their base, after the same manner as the common Houseleek; they are tongue-shaped, about two inches long, and a quarter of an inch broad, rounded at their points, and have a white, cartilaginous, sawed border. The stalk rises about a foot high; it is of a purplish colour, a little hairy, and sends out several horizontal branches the whole length. The flowers grow in small clusters at the end of the branches; they are white, and have several small red spots on the inside. This flowers in June.

It is easily propagated by offsets, which are sent out in plenty; they may be taken off at almost any season when the weather is mild, and should be planted in a very dry soil and a shady situation.

The third sort grows naturally on the Alps. The leaves of this sort are gathered into circular heads like the former, but are not more than half an inch long, and are wedge-shaped, the upper part being broad and rounded, but they diminish all the way to their base, where they are narrow; their borders are edged and indented in the same manner as those of the former. The stalk, in the places where the plant grows naturally, seldom rises more than six inches high, but, when transplanted into gardens, is often more than a foot; these have small leaves sitting close to them their whole length. The flowers are disposed in loose panicles on the top of the stalks; they are white and spotted with red. This sort flowers in June, and may be propagated in the same manner as the former.

The fourth sort grows naturally on the mountains in Italy. The leaves of this are gathered into circular heads like those of the two former; they are two inches long, and half an inch broad, tongue-shaped, rounded at their points, and have cartilaginous sawed borders. The stalk rises a foot and a half high, branching out near the ground, forming a natural pyramid to the top; the flowers have five wedge-shaped petals which spread open; they are white, and have ten stamina placed circularly the length of the tube, terminated by roundish purple summits. It flowers in June. When these plants are strong, they produce

duce very large pyramids of flowers, which make a fine appearance, so are very ornamental for halls, or to place in chimneys, where, being kept in the shade, and screened from winds and rains, they will continue in beauty much longer than if kept in the open air.

This plant is easily propagated by offsets, which are put out from the side of the old plants in plenty. These are usually planted in pots filled with fresh light earth, and in the summer season placed in the shade, but in the winter it should be exposed to the sun, and all the offsets should be taken off, leaving the plants single, which will cause them to produce a much stronger stem for flowering; for where there are offsets about the old plant, they exhaust the nourishment from it, whereby it is rendered much weaker. These offsets must be each planted in a separate halfpenny pot, filled with fresh earth, in order to succeed the older plants, which generally perish after flowering; the offsets will produce flowers the second year, so that there should be annually some of them planted to succeed the others.

The fifth sort grows naturally on the Helvetian mountains; this hath a perennial root. The stalk is erect, about a foot high, channelled and hairy; it is garnished with kidney-shaped leaves which are sharply indented, and puts out a few slender foot-stalks from the side toward the upper part; these, and also the principal stalks, are terminated by small clusters of white flowers marked with several red spots. This sort flowers in May; it is propagated by parting the roots; the best time for this is in autumn, that the plants may have good roots before the dry weather in the spring. It loves a shady situation and a loamy soil.

The sixth sort grows naturally on the Alps and Pyrenean mountains. The root is fibrous and perennial; the leaves are thick, kidney-shaped, and crenated on their edges; they are of a deep green on their upper side, but pale on their under, standing upon long, thick, hairy foot-stalks; these branch out into a panicle, which sustains several small white flowers marked with red spots; the stamina of this sort are longer than the petals. It flowers in June, and propagates very fast by offsets, which should be taken off in autumn, and planted in a shady situation, where they will thrive fast enough.

The seventh sort is known by the titles of London Pride, or None-so-pretty; it grows naturally on the Alps, and also in great plenty upon a mountain called Mangerton, in the county of Kerry in Ireland. The roots of this are perennial; the leaves are oblong, oval, and placed circularly at bottom; they have broad, flat, furrowed foot-stalks near two inches long, deeply crenated on their edges, which are white; the stalk rises about a foot high, is of a purple colour, stiff, slender, and hairy; it sends out from the side on the upper part several short foot-stalks, which are terminated by white flowers spotted with red; the stamina are longer than the petals of the flower, as are also the two styles; these have red stigmas. It flowers in June, and may be propagated in the same way as the former; it loves a shady situation.

The eighth sort grows naturally in North America; this is a perennial plant with a fibrous root, from which arise several leaves which are spear-shaped; they are seven or eight inches long, and two broad toward the top, having several small indentures on their edges; they are of a deep green, and thick consistence, spreading near the ground. The stalk rises a foot and a half high, is naked, and branches at the top in form of a panicle, sustaining very small herbaceous flowers, which are collected into small heads. This sort flowers in June.

It is propagated by parting the root; the best time is in autumn; it loves a moist soil and a shady situation, and is never injured by cold.

The ninth sort grows naturally upon some mountains in Wales; this hath a fibrous perennial root, from which come out oblong, roundish, indented leaves;

they are near two inches long, and an inch and a half broad, deeply indented, or rather sawed on their edges, sitting very close to the root. The stalk rises about five inches high; it is naked, and terminated by a close compact cluster of white flowers; these appear in July, and if they are in a shady situation, will continue almost a month. This plant must have a shady situation and a loamy soil, otherwise it will not thrive.

The tenth sort grows naturally upon the Austrian mountains; it has also been found growing in plenty on Knotsford Moor in Cheshire; this is a perennial plant. The leaves are gathered in clusters at the bottom; they are spear-shaped, about two inches long, and half an inch broad in the middle, drawing to a point at both ends; the stalk rises about six inches high, and is garnished with narrow leaves the whole length, which are placed alternately, and sit close to the stalks; the flowers are produced in small clusters at the top of the stalk; they have five yellowish petals which spread open, having several red spots on their inside. This plant flowers in August. It is difficult to propagate in gardens, for it naturally grows upon bogs; so that unless it is planted in such loose rotten earth, and kept constantly moist, it will not thrive.

The eleventh sort grows naturally upon the Pyrenean and Helvetian mountains, as also upon Ingleborough-hill in Yorkshire, Snowden in Wales, and other high places in the north of England: this is a perennial plant, whose stalks trail upon the ground, and are seldom more than two inches long; these are garnished with small oval leaves standing opposite, which lie over each other like the scales of fish; they are of a brown green colour, and have a resemblance of Heath. The flowers are produced at the end of the branches; they are pretty large, and of a deep blue, so make a pretty appearance during their continuance, which is great part of March, and the beginning of April.

This is propagated by parting of the roots; the best time for doing it is in autumn: it must have a shady situation and a moist soil, otherwise it will not thrive in gardens.

The twelfth sort grows naturally upon the Alps, Pyrenees, and Helvetian mountains; it is also found growing plentifully on Ingleborough-hill in Yorkshire, Snowden in Wales, and some other places in the north; this is a perennial plant, whose branches spread flat upon the ground, and put out roots at their joints; these are garnished with fine soft leaves like Moss, some of which are entire, and others cut into three points. The branches join so close together, as to form a soft roundish bunch like a pillow or cushion, from whence some have given it the appellation of Ladies Cushion; the stalks rise three or four inches high; they are slender, erect, and have two or three small leaves, some are entire, and others trifid; they are of a bright green colour, and soft to the touch; the flowers grow in small bunches at the top of the stalk; they are small, and of a dirty colour, so make no great appearance; these come out in June.

This sort propagates fast enough by its trailing branches, provided it is planted in a moist soil and a shady situation, but it will not thrive in dry ground, or where it is much exposed to the sun. The best time to remove any of these plants is in autumn, that they may have the benefit of the winter's rain to establish them well before the dry weather of the spring comes on; for when they are planted late, they are very subject to die, unless they are supplied with water, and those which live seldom make any figure the first year.

SCABIOSA. Tourn. Inst. R. H. 463. tab. 263, 264. Lin. Gen. Plant. 108. [so called from scabies, Lat. a scab, because this plant is said to heal the scab.] Scabious.

The CHARACTERS are,

The common empalement is composed of many leaves, is spreading, containing many flowers: it has several series

of leaves surrounding the receptacle on which they sit; the inner are gradually smaller. The flowers have a double empalement, and sit upon the germen; the outer is short, membranaceous, folded, and permanent; the inner is divided into five awl-shaped capillary segments. The florets have one erect tubulous petal, cut into four or five parts at the brim; they have four weak, awl-shaped, hair-like stamina, terminated by oblong prostrate summits. The germen is situated under the receptacle of the florets, supporting a slender style, crowned by an obtuse stigma, which is obliquely indented; it afterward becomes an oblong oval seed sitting in the common empalement; and crowned by the cup of the flower.

This genus of plants is ranged in the first section of Linnæus's fourth class, which contains those plants whose flowers have four stamina and one style.

The SPECIES are,

1. SCABIOSA (*Arvensis*) corollulis quadrifidis radiantibus, caule hispido. Hort. Cliff. 31. *Scabious with quadrifid radiated florets, and a rough hairy stalk.* Scabiosa pratensis hirsuta, que officinarum. C. B. P. 269. *Hairy Meadow Scabious of the shops.*
2. SCABIOSA (*Succisa*) corollulis quadrifidis æqualibus, caule simplici, ramis approximatis, foliis lanceolato-ovatis. Hort. Cliff. 30. *Scabious with quadrifid florets which are equal, a single stalk, and branches growing near, with spear-shaped oval leaves.* Scabiosa integrifolia, glabra, radice præmorsâ. H. L. B. *Scabious with an entire smooth leaf, and a bitten root, called Devil's-bit.*
3. SCABIOSA (*Transylvanica*) corollulis quadrifidis æqualibus squamis calycinis ovatis obtusis. Lin. Sp. Plant. 98. *Scabious with quadrifid florets which are equal, and the scales of the empalement oval and obtuse.* Scabiosa altissima annua, foliis agrimonie nonnihil similibus. H. L. B. *Tallest annual Scabious, with leaves not unlike Agrimony.*
4. SCABIOSA (*Centauroides*) corollulis quadrifidis fistulosis æqualibus, squamis calycinis acutis, caule paniculato, foliis rigidis pinnatifidis. *Scabious with quadrifid fistulous florets which are equal, acute scales to the empalement, a paniculated stalk, and stiff wing-pointed leaves.* Scabiosa annua fistulosa, centauroides. H. Cath. *Annual fistulous Scabious, resembling the greater Centaury.*
5. SCABIOSA (*Montana*) corollulis quadrifidis æqualibus, staminibus longioribus, squamis calycinis acutis, foliis radicalibus lanceolatis integerrimis caulinis divisis. *Scabious with quadrifid equal florets, longer stamina, acute scales to the empalement, and the lower leaves spear-shaped and entire, but those on the stalks divided.* Scabiosa montana glabra, foliis scabiosæ vulgaris. C. B. P. 270. *Smooth Mountain Scabious, with leaves like the common sort.*
6. SCABIOSA (*Altissima*) corollulis quadrifidis radiantibus caule hispido, foliis lanceolatis pinnatifidis, foliolis imbricatis. Lin. Sp. Plant. 99. *Scabious with radiated quadrifid florets, a rough hairy stalk, and spear-shaped wing-pointed leaves, with lobes set over each other in the manner of tiles.* Scabiosa altissima segetum. Triumf. Raii Hist. App. 236. *The tallest Corn Scabious.*
7. SCABIOSA (*Rigida*) corollulis quadrifidis æqualibus, calycinis ovatis obtusis, foliis pinnatifidis. *Scabious with equal quadrifid florets, neat, oval, obtuse empalements, and wing-pointed leaves.* Scabiosa fruticans angustifolia. C. B. P. 270. *Narrow-leaved shrubby Scabious.*
8. SCABIOSA (*Graminifolia*) corollulis quinquefidis foliis lineari-lanceolatis, caule herbaceo. Lin. Sp. 145. *Scabious with radiated quinquefid florets, linear leaves, and an herbaceous stalk.* Scabiosa argentea angustifolia. C. B. P. 271. *Silvery narrow-leaved Scabious.*
9. SCABIOSA (*Virgæ pastoris*) corollulis quinquefidis æqualibus, caule erecto hispido, foliis lanceolatis denticulatis hirsutis, semi-amplexicaulibus. *Scabious with equal quinquefid florets, an erect stalk which is rough and hairy, and spear-shaped hairy leaves which are somewhat indented, and half embrace the stalks.* Scabiosa virgæ pastoris folio. C. B. P. 270. *Scabious with a Shepherd's Rod leaf.*
10. SCABIOSA (*Alpina*) corollulis quadrifidis æqualibus floribus cernuis, foliis pinnatis foliolis lanceolatis serratis. Hort. Cliff. 30. *Scabious with radiated florets,*

and winged sawed leaves. Scabiosa Alpina foliis centaurei majoris. C. B. P. 270. *Alpine Scabious, with leaves like those of the greater Centaury.*

11. SCABIOSA (*Cretica*) corollulis quinquefidis, foliis lanceolatis confertissimis integerrimis, caule suffruticoso. *Scabious with radiated quinquefid florets, linear, spear-shaped, entire leaves, and an under shrub stalk.* Scabiosa frutescens, foliis leucii hortensis. H. Cath. *Shrubby Scabious with a Stock Gilliflower leaf.*
12. SCABIOSA (*Frutescens*) corollulis quinquefidis, foliis lanceolatis confertissimis subintegerrimis. Hort. Cliff. 31. *Scabious with quinquefid florets, and spear-shaped leaves in clusters, which are almost entire.* Scabiosa stellata, folio non dissecto. C. B. P. 271. *Starry Scabious with an undivided leaf.*
13. SCABIOSA (*Oroleuco*) corollulis pinnatis radicalibus bipinnatis petiolis perfoliatis. Lin. Sp. Plant. 101. *Scabious with radiated quinquefid florets, and linear doubly-winged leaves.* Scabiosa multifida folio, flore flavescente. C. B. P. 270. *Scabious with a many-pointed leaf and a yellowish flower.*
14. SCABIOSA (*Argentea*) corollulis quinquefidis, foliis pinnatis, laciniis lanceolatis, pedunculis nudis lævibus longissimis. Prod. Leyd. 190. *Scabious with quinquefid florets, winged leaves having spear-shaped segments, and long, naked, smooth foot-stalks.* Scabiosa Orientalis argentea, foliis inferioribus incis. Tourn. Cor. 34. *Silvery Eastern Scabious, whose lower leaves are cut.*
15. SCABIOSA (*Atropurpurea*) corollulis quinquefidis, foliis dissectis, receptaculis florum subulatis. Hort. Cliff. 31. *Scabious with five-pointed florets, cut leaves, and awl-shaped receptacles to the flowers.* Scabiosa peregrina, capitulo oblongo nigricante. C. B. P. 270. *Foreign Scabious, with an oblong head and black flowers.*
16. SCABIOSA (*Stellata*) corollulis quinquefidis, foliis dissectis, receptaculis florum subrotundis. Hort. Cliff. 31. *Scabious with five-pointed florets, cut leaves, and roundish receptacles to the flowers.* Scabiosa stellata folio laciniato major. C. B. P. 271. *Greater starry Scabious with a cut leaf.*
17. SCABIOSA (*Africana*) corollulis quinquefidis, foliis inferioribus integris crenatis, caulinis inciso-crenatis, caule fruticoso. *Scabious with five-pointed florets, the lower leaves entire and crenated, those upon the stalks bluntly cut, and a shrubby stalk.* Scabiosa Africana frutescens. Par. Bat. 219. *Shrubby African Scabious.*
18. SCABIOSA (*Incisus*) corollulis quinquefidis, foliis inferioribus crenatis, caulinis duplicato-pinnatis, caule fruticoso hirsuto. *Scabious with five-pointed florets, the under leaves crenated, those on the stalks doubly winged, and a shrubby hairy stalk.* Scabiosa Africana frutescens, maxima, foliis tenuissimè incis. Boerh. Ind. alt. 1. 128. *Greatest shrubby African Scabious, with leaves very slightly cut.*
19. SCABIOSA (*Fimbriatus*) corollulis multifidis, calycibus florum longioribus, caule ramoso foliis dissectis. *Scabious with many-pointed florets, longer empalements to the flowers, a branching stalk, and cut leaves.* Scabiosa Orientalis stellata, foliis variis flore carneo, semiflosculis florum fimbriatis. Edit. prior. *Eastern starry Scabious, with various leaves, a flesh-coloured flower, and the half florets fringed.*

The first sort grows naturally in the fields in divers parts of England; this hath a strong, thick, fibrous root, which runs deep into the ground, sending out many branching stalks, which rise near three feet high; the lower leaves are sometimes almost entire, and at others they are cut into many segments almost to the midrib; they are seven or eight inches long, and from three to four broad in the middle, hairy, and sit close to the root. The stalks are covered with stiff prickly hairs, and garnished with smaller leaves at each joint, which are cut into narrow segments almost to the midrib. The flowers are produced upon naked foot-stalks at the end of the branches; these have a double empalement, which is hairy, and are composed of several tubulous florets, cut into four points at the top, each having a particular empalement, resting upon the common placenta. The florets round the border are larger and deeper

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cut than those which compose the disk or middle, their outer segments being much longer than the two side ones, and those are longer than the inner segment; they have four weak stamina, which soon shrink after the flowers open. In the center is situated a style which is longer than the floret, terminated by a roundish stigma. The flowers are of a pale purple colour, and have a strong faint odour; they appear in June, and the stalks decay to the root every autumn. This sort is intended by the College of Physicians for medicinal use, under the title of Scabiosa.

The second sort grows naturally in moist woods and pastures in most parts of England, and is directed by the College of Physicians to be used, under the title of *Morsus Diaboli*, or Devil's-bit; this hath a short tap-root, which appears as if the end of it were bitten or cut off, from whence it had the title of *Succisa*, and *Morsus Diaboli*. The leaves are oval, spear-shaped, and smooth; they are four inches long, and two broad in the middle, drawing to a point at each end; the stalks are single, about two feet high, garnished with two leaves at each joint, shaped like those below, but are smaller; they generally send out two short foot-stalks from their upper joint standing opposite, which are each terminated by one small blue flower, as is also the principal stalk with one larger. These are constructed in the same way as the former, and appear in August. As these plants are to be found plentifully in the fields and woods, so they are seldom admitted into gardens.

The third sort grows naturally in Transylvania; this is an annual plant, which is preserved in botanic gardens for variety; but as the flowers have little beauty, so it is rarely allowed a place in other gardens. The stalks rise four or five feet high, dividing into several branches; the leaves are hairy, and cut almost to the midrib. The flowers are small, of a pale purplish colour, and appear in July; the seeds ripen in autumn, when, if they are permitted to scatter, the plants will come up without care; if these are thinned and kept clean from weeds, it is all the culture they require.

The fourth sort grows naturally in Spain and Portugal; it is an annual plant; the stalk is stiff, and rises upward of three feet high, dividing toward the top into several branches, which are again divided into naked foot-stalks, each sustaining one small, pale, purplish flower, composed of many florets; the leaves are stiff, and cut into many winged points. It flowers and seeds about the same time as the former.

The fifth sort grows naturally upon the Alps and Apennines; this hath a perennial root, from which come out many entire, smooth, spear-shaped leaves; the stalk is single, sending out two short naked foot-stalks from the upper joint; the leaves upon the stalks are cut pretty deeply on their edges. The flowers are nearly of the same size and form with those of the first sort; it may be propagated by seeds, and will thrive in a shady moist border, requiring no other care but to keep the ground clean, and allow them room to spread.

The sixth sort is a biennial plant, which grows naturally in some parts of Italy, and also in Tartary. It rises with a strong branching stalk four or five feet high, closely armed with stiff prickly hairs; the lower leaves are spear-shaped, about seven inches long, and near four broad in the middle, cut deeply on the sides in winged points; those upon the stalks are more entire, some of them are sharply sawed on their edges, and those at the top are linear and entire. The flowers grow from the sides and at the top of the stalks; they are white, and each flower sits in a bristly empalement. This flowers in July, and the seeds ripen in autumn; it rises from scattered seeds, and requires no care.

The seventh sort grows naturally in Istria; this hath a perennial root; the lower leaves are almost entire, and are sawed on their edges; the stalk is stiff, and rises two feet high, dividing into two upward, which

spread asunder, and in the division arises a naked foot-stalk, which (as also the side branches, are terminated by single flowers, composed of many white florets, which are inclosed in a scaly empalement, whose scales are obtuse; the leaves on the stalks are wing-pointed and stiff. This flowers in July, but seldom produces good seeds here; it is propagated by parting of the roots in autumn, and delights in a light loamy soil.

The eighth sort grows naturally upon the mountains in Italy; this hath a perennial root, from which arise three or four stalks, whose lower parts are garnished with linear leaves about four inches long, and the eighth of an inch broad, of a silvery colour, ending in acute points: the upper part of the stalk is naked for six or seven inches in length, sustaining at the top one pale blue flower, made up of several four-pointed florets. This plant flowers in July, but does not produce seeds in England; it is propagated by slips, which should be planted on a shady border the beginning of April; when these have put out good roots, they may be taken up with balls of earth, and transplanted where they are to remain. This plant loves a soft loamy soil, and a shady situation.

The ninth sort grows naturally on the Alps; this has a perennial root, from which arise several pretty strong hairy stalks near three feet high, which are garnished with spear-shaped leaves about four inches long and two broad; these are placed opposite, and embrace the stalks half round with their base; they are of a dark green on their upper side, but pale on their under and hairy, having a few indentures on their edges, and ending in acute points. The flowers are produced at the top of the stalks, in the same manner as those of the first sort, and are like them; these appear in June, and the seeds ripen in autumn. This is hardy, and loves a light loamy soil and a shady situation; it is propagated by seeds.

The tenth sort grows naturally on the Alps; this hath a perennial root, composed of many strong fibres which root deep in the ground, from which arise several strong channelled stalks upward of four feet high, garnished with winged leaves composed of four or five pair of lobes, which are unequal in size and irregularly placed; they are sawed on their edges, and end in acute points. The flowers are produced on naked foot-stalks at the end of the branches, the receptacles are globular; the flowers are of a whitish yellow, and appear the latter end of June. The seeds ripen in autumn. This may be propagated, either by seeds, or parting of the roots; it loves a loamy soil.

The eleventh sort grows naturally in Sicily; this rises with a shrubby stalk three feet high, and divides into several ligneous knotty branches, which are garnished with narrow silvery leaves, four inches long and a quarter of an inch broad, which are entire. The flowers stand upon very long naked foot-stalks at the end of the branches; they are made up of many five-pointed tubulous florets, of a fine blue colour. These appear in July, but are not succeeded by seeds here. It is propagated by slips or cuttings, which readily take root if they are planted in any of the summer months, if they are shaded from the sun, and duly refreshed with water. When these have made good root, some of them may be planted on a dry border near to a south wall, where they will live in common winters; but as they are frequently destroyed by severe frost, so some of the plants should be planted in pots, and in winter placed under a common frame, where they may be protected from frost, but in mild weather enjoy the free air.

The twelfth sort grows naturally in Crete; this hath a shrubby stalk, which rises about the same height as the former, and divides into many branches; the leaves are shorter, much broader, and not so white as those of the former sort; the flowers are not so large, and are of a pale purple colour. This sort flowers from the end of June till autumn, but it seldom ripens seeds in England. It is propagated by slips or cuttings

in the same way as the former, and requires the same treatment.

The thirteenth sort grows naturally in Germany; this hath a perennial root, from which come out many leaves that spread near the ground, which are about five or six inches long, divided into narrow segments to the midrib; these segments are cut on their edges into regular acute points, like winged leaves; the stalks rise near two feet high, and are garnished with very narrow cut leaves; they divide into several long foot-stalks, each being terminated by a roundish flower, with radiated borders. This flowers in July, and the seeds ripen in autumn. It may be propagated by seeds, and will thrive any where.

The fourteenth sort grows naturally in the Levant; this is a low perennial plant, with a branching stalk which spreads wide on every side; the lower leaves are cut, but the upper leaves are narrow and entire; they are of a silvery colour. The flowers are small, of a pale colour, and have no scent, so is only kept in botanic gardens for the sake of variety. It is propagated by seeds, and is hardy enough to live in the open air.

The fifteenth sort grows naturally in India; this is an annual plant, which is commonly cultivated in gardens for ornament. Of this there are a great variety in the colour of their flowers, some of them are of a purple approaching to black, others are of a pale purple, some are red, and others have variegated flowers; these also vary in the shape of their leaves, some of them having finer cut leaves than others; and sometimes from the side of the flower-cup there comes out many slender foot-stalks, sustaining small flowers, in like manner as the Hen and Chicken Daisies; but as these are accidental varieties which come from the same seeds, they need not be particularly enumerated here.

The flowers of this sort are very sweet, and continue a long time. The plants are propagated by sowing of their seeds, the best time for which is about the latter end of May or the beginning of June, that the plants may get strength before winter; for if they are sown too early in the spring, they will flower the autumn following; and the winter coming on soon, will prevent their ripening seeds; besides, there will be fewer flowers upon those, than if they had remained strong plants through the winter, and had sent forth their flower-stems in spring; for these will branch out on every side, and produce a prodigious number of flowers, and continue a succession of them on the same plants from June to September, and produce good seeds in plenty.

The seeds of these plants should be sown upon a shady border of fresh earth (for if they are sown upon a place too much exposed to the sun, and the season should prove dry, few of them will grow.) When the plants are come up, they may be transplanted into other beds or borders of fresh earth, observing to water and shade them until they have taken root; after which they will require no farther care but to keep them clear from weeds till Michaelmas, when they may be transplanted into the middle of the borders in the pleasure-garden, where the several sorts being intermixed, will make an agreeable variety. They are extreme hardy, being rarely injured by cold, unless they have shot up to flower before winter, but do not continue after ripening their seeds.

The sixteenth sort grows naturally in Spain; this is an annual plant; the stalks rise three feet high, they are hairy, and are garnished with oblong leaves which are deeply notched on their edges, and those on the upper part of the stalk are cut almost to the midrib into fine segments. The flowers stand upon long foot-stalks at the top of the stalks, these have globular receptacles; the florets are large, and spread open like a star; they are of a pale purple colour, appearing in July, and in favourable seasons the seeds ripen in September, but in cold moist years the seeds do not ripen here.

It is propagated by seeds, which should be sown in

beds of light loamy earth, where the plants are to remain; when the plants come up they must be thinned and kept clear from weeds, which is all the culture they require.

The seventeenth sort grows naturally at the Cape of Good Hope; this hath a weak shrubby stalk which divides into several branches, and rises about five feet high; the branches are garnished with oval spear-shaped leaves three inches long, and an inch and a half broad, which are entire, and deeply crenated on their edges; they are of a light green, and are a little hairy. The flower-stalk is produced at the end of the branches, sustaining one pale flesh-coloured flower, composed of many five-pointed florets. This plant continues flowering great part of summer, and sometimes it produces good seeds in England.

The eighteenth sort is also a native of the Cape of Good Hope; it hath a shrubby stalk like the former; the stalks are hairy, and divide into several branches, which are garnished toward the bottom with spear-shaped leaves which are crenated and entire, but those on the upper part of the stalk are doubly winged. The flowers are produced upon long naked stalks from the end of the branches, they are of a pale flesh colour, and are large, but have no scent; these are continued in succession all the summer, and sometimes the early flowers are succeeded by seeds which ripen in autumn.

Both these sorts may be propagated by cuttings, which may be planted in a shady border during any of the summer months; when these have put out good roots, they should be taken up and planted in pots filled with light loamy earth, and placed in the shade till they have taken new root; then they may be removed to a sheltered situation, where they may remain till the frosts begin, when they should be removed to shelter, for they are too tender to live in the open air through the winter; but as they only require protection from frost, so they should have as much free air as possible in mild weather, to prevent their being drawn up weak; therefore if they are placed in a common frame in winter, they will succeed better than in a green-house; and in the middle or latter end of April, they may be placed in the open air in a warm situation, afterward treating them as other hardy foreign plants.

The nineteenth sort grows naturally near Aleppo; this is an annual plant, with a branching stalk near three feet high, which is garnished with leaves at each joint that are variously cut. The flowers are produced upon long foot-stalks at the end of the branches, these have very long empalements; the florets round the border are cut into several fringed segments. They are of a flesh colour, and continue in succession from July to autumn, and in favourable seasons the seeds ripen here pretty well. This is propagated by seeds, which should be sown, and the plants afterward treated in the same way as the common Sweet, or Indian Scabious.

There are several other species of this genus, but as they are plants which have little beauty, so they are rarely admitted into gardens, therefore they are not enumerated here.

SCANDIX. Tourn. Inst. R. H. 326. tab. 173. Lin. Gen. Plant. 319. Shepherd's-needle, or Venus-comb.

The CHARACTERS are,

It hath an umbelliferous flower; the general umbel is long and has few rays, the particular umbels have many: the general umbel has no involucre, the particular have a five-leaved one the length of the umbels: the general umbel is deformed, and has hermaphrodite florets in the disk, and female in the rays. The flowers have five inflexed heart-shaped petals, the inner are small, and the outer large; they have five slender stamina terminated by roundish summits, and an oblong germen supporting two permanent styles, crowned by obtuse stigmas. The germen afterward turns to a long fruit divided in two parts, each having one furrowed seed, convex on one side and plain on the other.

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This genus of plants is ranged in the second section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and two styles; and to this genus he has added some species of Myrrhis and Cerefolium.

The SPECIES are,

1. SCANDIX (*Petien*) feminibus lævibus rostro longissimo. Hort. Cliff. 101. *Scandix with smooth seeds and the longest beak.* Scandix femine rostrato vulgaris. C. B. P. 152. *Common Shepherd's-needle with beaked seeds.*
2. SCANDIX (*Australis*) feminibus subulatis hispidis, floribus radiatis, caulibus lævibus. Lin. Sp. Plant. 257. *Scandix with prickly awl-shaped seeds, radiated flowers, and smooth stalks.* Scandix Cretica minor. C. B. P. 152. *Smaller Shepherd's-needle of Candy.*
3. SCANDIX (*Grandiflora*) feminibus pedunculo villosa brevioribus. Flor. Leyd. 111. *Scandix with short hairy foot-stalks to the seeds.* Scandix Orientalis flore maximo. Tourn. Cor. 23. *Eastern Shepherd's-needle with a very large flower.*
4. SCANDIX (*Cretica*) feminibus hispidis, involucris umbello multifidis, caulibus asperis. Scandix with bristly seeds, many-pointed involucrums to the umbels, and rough stalks. Scandix Cretica major. C. B. P. 152. *Greater Shepherd's-needle from Candy.*
5. SCANDIX (*Odorata*) feminibus fulcatis angulatis. Hort. Cliff. 101. *Scandix with angular furrowed seeds.* Myrrhis major cicutaria odorata. C. B. P. 160. *Sweet Cecily, or great sweet Chervil, by some sweet Fern.*
6. SCANDIX (*Anthriscus*) feminibus ovatis hispidis, corollis uniformibus, caule lævi. Lin. Sp. Plant. 257. *Scandix with oval rough seeds, the petals of the flowers uniform, and a smooth stalk.* Myrrhis sylvestris feminibus asperis. C. B. P. 160. *Wild Myrrh with rough seeds.*
7. SCANDIX (*Procumbens*) feminibus nitidis ovato-subulatis, foliis decompositis. Gron. Virg. 147. *Trailing Scandix with neat, oval, awl-shaped seeds, and decomposed leaves.* Cerefolium Virginianum procumbens, fumarie foliis. Mor. Hist. 3. p. 303. *Trailing Virginian Chervil with Fumitory leaves.*

The first sort grows naturally in stiff lands amongst the Corn in many parts of England, so is not cultivated in gardens. It is an annual plant; the leaves are finely divided into small segments, and have long foot-stalks; the stalks branch and rise six inches high. The flowers are small, white, and like those of wild Chervil, and sit upon the top of the beak or horns, which are the rudiment of the horn. At the bottom of the small umbel five leaves embrace the stalk with broad and short foot-stalks, which are afterward cut into small segments like the rest: the seed is long, and runs into a small point, resembling a large needle, but the umbels have great resemblance to the umbels of Musk Crane's-bill. It flowers in June, and the seeds ripen the end of July, which, if permitted to scatter, there will be a plentiful supply of young plants.

The second sort grows naturally in the south of France, in Italy, and Crete. This is an annual plant with low spreading stalks, garnished with very narrow fine cut leaves, placed thinly. The flowers are small, white, and stand in small umbels at the top of the stalks; these are succeeded by awl-shaped rough seeds. It flowers and seeds about the same time as the former.

The third sort grows naturally in the Levant; this is an annual plant, with fine cut leaves; the stalks rise eight inches high, garnished at each joint with a fine cut leaf, and are terminated by an umbel of white flowers, with large heart-shaped petals. The horns of this are longer than of any other sorts, and their foot-stalks are very short and hairy.

The fourth sort grows naturally in Crete; this hath larger leaves than either of the former, and are finely cut; the stalks grow a foot long, and divide into many branches, they are rough and channelled; the umbels have many-leaved involucrums, and the seeds are rough. It flowers at the same time as the former.

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These four sorts will sow themselves wherever they are once introduced, and require no other care but to thin them and keep them clean from weeds.

The fifth sort grows naturally in Germany, but has been long kept in the English gardens; and of late years the seeds have been thrown out of gardens, so that the plants are frequently found growing naturally in the neighbourhood of those gardens. It has a very thick perennial root, composed of many thick fibres, of a sweet aromatic taste like Aniseed, from which come forth many large leaves that branch out somewhat like those of Fern, from whence it was titled Sweet Fern. The stalks grow four or five feet high, they are hairy and fistulous. The flowers are disposed in an umbel at the top of the stalk, they are white, and have a sweet aromatic scent; the outer petal of the flowers is large, the two side ones are of a middle size, but the two inner are small; these appear the latter end of May, and are succeeded by long angular furrowed seeds, having the taste and scent of Aniseed, which ripen in July.

This sort propagates fast by seeds, which, if permitted to scatter, there will be plenty of the plants arise, and these may be transplanted to any abject part of the garden, for it will grow in any soil or situation, and will require no care.

It stands in the list of medicinal plants, but is rarely used. Formerly the young leaves of this plant were put into fallads, but it has been long disused for the table in England, but in Germany it is put into soups.

The sixth sort grows naturally on the side of banks and foot-ways in many parts of England; this is an annual plant, whose seeds drop early in the summer; the plants come up in autumn, and flower early in the spring. The leaves of this are finely divided, very like those of the Garden Chervil, but are hairy; the stalks rise a foot and a half or two feet high, dividing into branches. These sustain umbels of small white flowers which come out early in April, and are succeeded by short, hairy, crooked seeds, which ripen in June, and soon after the plants decay.

There have been some instances of the ill effects of this plant when taken inwardly; some who have eaten this herb in soups, by mistaking it for Garden Chervil, have narrowly escaped with their lives.

The seventh sort grows naturally in Virginia; it is a low trailing plant of no great beauty or use, so is only preserved in botanic gardens for variety.

SCHEUCHERIA. Lin. Gen. Plant. 452. Sp. Plant. 482.

The CHARACTERS are,

The empalement of the flower is divided into six oblong, reflexed, permanent segments; it has no corolla, but hath six capillary stamina crowned by long compressed summits; and three oval compressed germina the size of the empalement having no styles, but oblong stigmas sitting on the germen.

This genus of plants is ranged in the third section of Linnæus's sixth class, which contains those plants whose flowers have six stamina and three stigmas.

We have but one SPECIES of this plant, viz.

SCHEUCHERIA (*Palustris*.) Flor. Lapp. 133. *Marsh Scheucheria.* Juncus floribus minor. C. B. P. 12. *Smaller flowering Rush.*

This plant grows naturally in marshes, so is rarely admitted into gardens, therefore I shall not trouble the reader with any further account of it.

SCHINUS. Lin. Gen. Plant. 1130. Molle. Tourn. Inst. R. H. 661. Indian Mastick.

The CHARACTERS are,

It is male and female in different plants. The empalement of the male flowers are of one leaf, divided into five acute segments which spread open; the flower hath five oval spreading petals on foot-stalks, and ten slender stamina the length of the corolla, crowned by roundish summits; these have no rudiments of fruit. The female flowers have a one-leaved empalement, divided into five acute segments which are permanent; and five oblong spreading petals, with a germen having no style, but three oval stigmas.

The germen becomes a globular berry with three cells, inclosing one globular seed.

This genus of plants is ranged in the second section of Linnæus's twenty-second class, which includes those plants which have male and female flowers on different plants.

The SPECIES are,

1. SCHINUS (Molle) foliis pinnatis, foliolis ferratis, impari longissimo, petiolo æquali. Lin. Sp. Plant. 338. *Schinus with winged leaves whose lobes are sawed, the end one being very long, and the foot-stalks equal. Lentiscus Peruviana. C. B. P. 399. Peruvian Mastick-tree; and the Molle. Clus. Mon. 322. the Arbor Molle.*
2. SCHINUS (Areira) foliis pinnatis, foliolis integerimis æqualibus, petiolo æquali. Lin. Sp. Plant. 1467. *Peruvian Mastick-tree with winged leaves, whose lobes and foot-stalks are equal, and the lobes entire. Molle foliis non ferratis. Feuill. Peruv. 3. p. 43. Molle with unsawed leaves.*

Both these sorts grow naturally in Peru and Mexico, from which countries I have received the seeds. The first sort rises with a woody stem eight or ten feet high, dividing into many branches, covered with a brown rough bark; the leaves are placed alternate on the branches; they are composed of several pair of lobes, from ten to fifteen, and are terminated by one lobe which is longer than the others; the lobes are about an inch and a half long, and a quarter of an inch broad at their base, lessening gradually to the point, and have a few saws on their edges; they are of a lucid green, and emit a turpentine odour when bruised. The flowers are produced in loose bunches at the end of the branches; they are very small, white, and have no odour, composed of five small petals which spread open; these have small empalements of one leaf, indented in five parts at the brim. They appear in July, but are not succeeded by seeds in England.

This plant is propagated best by seeds, which must be procured from the countries where they naturally grow: these should be sown in pots filled with fresh earth, and plunged into a moderate hot-bed. If the seeds are good, the plants will appear in about five or six weeks; and if they are properly managed by admitting fresh air daily to them, according to the warmth of the season, and are duly refreshed with water, they will be fit to transplant in about five or six weeks after, when they should be carefully turned out of the pots and their roots separated; then they must be each planted in a small pot filled with soft loamy earth, and plunged again into a moderate hot-bed, shading them from the sun till they have taken fresh root; then they must be gradually inured to the open air, into which they should be removed soon after, placing them in a sheltered situation, where they may remain till autumn, but they must be removed into shelter before the first frosts, otherwise their tops will be killed, and thereby the plants are frequently destroyed.

These plants are tender when young, so require a little warmth in winter; but after two or three years growth, they will live in a good green-house, where, as they retain their leaves all the year, they will make a good variety. It may also be propagated by layers and cuttings; the layers should be put down in the spring, and by the following spring they will be rooted; the cuttings should be planted in April, which will put out roots in about two months, and may afterward be treated as the seedling plants.

The second sort differs from the first, in having entire lobes to the leaves, which are not sawed and are equal in size.

This sort is propagated in the same manner as the first, but as the young plants of it are much tenderer than those, so they will require to be placed in a moderate stove for four or five winters, after which time they may be kept in a good green-house, giving them little water in winter.

SCILLA. Lin. Gen. Plant. 378. Lilio-Hyacinthus. Tourn. Inst. R. H. 371. tab. 196. [so called of σκίλλω,

to make dry, because this plant grows in dry places; or as others will have it, of σκύλλω, I am molested; because the bulb of this plant, by its acrimony, irritates the parts to which it is applied.] Squills.

The CHARACTERS are,

The flower has no empalement; it has six oval petals which spread open like a star, and six awl-shaped stamina not more than half the length of the petals, terminated by oblong prostrate summits. It has a roundish germen supporting a single style, crowned by a single stigma. The germen afterward becomes a smooth oval capsule with three furrows, divided into three cells, which are filled with roundish seeds.

This genus of plants is ranged in the first section of Linnæus's sixth class, which includes those plants whose flowers have six stamina and one style. To this genus he added the Lilio-Hyacinthus, and several of Tournefort's species of Ornithogalums.

The SPECIES are,

1. SCILLA (Maritima) nudiflora bracteis refractis. Lin. Sp. Plant. 442. *Squill with naked flowers, whose bractea are broken. Scilla vulgaris, radice rubra. C. B. P. 73. Common Squill with a red root.*
2. SCILLA (Lilio-Hyacinthus) radice squamatâ. Hort. Cliff. 123. *Squill with a scaly root. Lilio-Hyacinthus vulgaris, flore cæruleo. Tourn. Inst. 372. Common Lily Hyacinth with a blue flower.*
3. SCILLA (Italica) corymbo conferto hemispherico. Lin. Sp. Plant. 442. *Squill with an hemispherical corymbus of flowers. Ornithogalum spicatum cæruleum. Tourn. Inst. R. H. 380. Blue spiked Star-flower.*
4. SCILLA (Peruviana) corymbo conferto conico. Lin. Sp. Plant. 309. *Squill with a conical corymbus of flowers. Ornithogalum cæruleum Lusitanicum, latifolium. Tourn. Inst. 381. Portugal, blue, broad-leaved Star-flower, commonly called Hyacinth of Peru.*
5. SCILLA (Amana) floribus lateralibus alternis subnulantibus. Hort. Cliff. 123. *Squill with flowers growing alternately from the sides of the stalk, which almost nod. Hyacinthus stellaris cæruleus amœnus. C. B. P. Fine blue starry Hyacinth.*
6. SCILLA (Bifolia) radice solidâ, floribus lateralibus erectiusculis paucioribus. Hort. Cliff. 123. *Squill with a solid root, and erect flowers growing thinly. Ornithogalum bifolium Germanicum cæruleum. Tourn. Inst. 380. Blue German Star-flower with two leaves, commonly called the early blue starry Hyacinth.*
7. SCILLA (Autumnalis) foliis filiformibus linearibus floribus corymbosis, pedunculis nudis adscendentibus longitudine floris. Lin. Sp. Plant. 443. *Squill with slender linear leaves, flowers growing in a corymbus, and naked foot-stalks rising over each other to the length of the flowers. Ornithogalum autumnale minus, floribus cæruleis. Tourn. Inst. 381. Smaller autumnal Star-flower with blue flowers, commonly called autumnal starry Hyacinth.*
8. SCILLA (Hispanica) radice solidâ, floribus paniculatis subnulantibus. *Squill with a solid root, and flowers growing in panicles which almost nod. Ornithogalum Hispanicum sature cæruleum. Tourn. Inst. 381. Star-flower of Spain with deep blue flowers.*
9. SCILLA (Purpurea) radice solidâ, racemo conico, floribus numerosis adscendentibus. *Squill with a solid root, and a conical spike of many flowers rising above each other. Ornithogalum purpureum. Tourn. Inst. 380. Purple Star-flower.*
10. SCILLA (Eriophora) radice solidâ, corymbo conferto hemispherico, scapo longissimo. *Squill with a solid root, an hemispherical corymbus, and the longest stalk. Ornithogalum Eriophorum, Peruvianum. Tourn. Inst. 381. Woolly Star-flower of Peru.*

The first is the Squill or Sea Onion whose roots are used in medicine, of which there are two sorts, one with a red, and the other a white root, which are supposed to be accidental varieties, but the white are generally preferred for medicinal use. The roots are very large, somewhat Pear-shaped, composed of many coats lying over each other like Onions; at the bottom come out several fibres which strike deep in the ground. From the middle of the root arise several

ral shining leaves a foot long, and two inches broad at their base, lessening all the length to the top, where they end in points; they continue green all the winter, and decay in the spring, and then the flower-stalk comes out which rises two feet high, is naked about half way, and is terminated by a pyramidal thyrse of flowers which are white, composed of six petals which spread open like the points of a star. This grows naturally on the sea-shores, and in the ditches, where the salt water flows in with the tides, in most of the warm parts of Europe, so cannot be propagated in gardens, the frost in winter always destroying the roots, and for want of salt water they do not thrive in summer. Sometimes the roots, which are brought for use, put out their stems and produce flowers without being planted in earth, as they lie in the druggist's shops.

The second sort grows naturally in Spain, Portugal, and the Pyrenees; this hath a scaly root like the Lily, for which reason Tournefort separated it from the starry Hyacinth, and constituted a genus of it with the title of *Lilio-Hyacinthus*. The root is oblong and yellow, very like those of Martagon; the leaves are shaped like those of the white Lily, but are smaller; the stalk is slender, and rises a foot high; it is terminated by blue flowers like those of the starry Hyacinth. It flowers in June, and the flowers are succeeded by oval seed-vessels having three cells, filled with roundish seeds.

The third sort grows naturally in Portugal; this hath a roundish, solid, bulbous root like the Hyacinth. The leaves come out sparsely, and are very like those of the English Hair-bells; the stalk rises seven or eight inches high, and is terminated by clustered flowers of a pale blue colour, which at first are disposed in a sort of umbel or depressed spike, but afterward draws up to a point, forming a conical corymbus; the flowers appear the latter end of April, which are succeeded by oval capsules with three cells, filled with roundish seeds.

The fourth sort grows naturally in Spain and Portugal, from whence I have received the roots; this has been long known in the English gardens by the title of Hyacinth of Peru. There are two varieties of this, one with a deep blue, and the other has a white flower; the latter is more rare here than the former. The root of this is large, solid, and raised in the middle a little pyramidal, covered with a brown coat, from which come out five or seven leaves before winter, which are six or eight inches long, broadest at their base, terminating in points; they are of a lucid green, keeled, and spread almost flat on the ground. From the center of these come out one, two, or three stalks according to the strength of the root; these are thick, succulent, and rise six or eight inches high, terminated by a conical corymbus of flowers, of a deep blue on some, and others are white, standing upon pretty long foot-stalks; they are composed of six petals which spread open like a star. In the center of the petals is situated a large roundish germen supporting a short style, crowned by a single stigma, and round the germen come out six short stamina which spread asunder, terminated by oblong prostrate summits. The germen afterward turns to a roundish three-cornered capsule having three cells, which are filled with roundish seeds. It flowers in May, and the seeds ripen in July.

The fifth sort grows naturally in Byzantium, and was introduced here about the year 1590. The root of this is large, solid, and of a purplish colour, from which come out five or six leaves which lie on the ground; they are above a foot long, and an inch broad; they are keeled, channelled, and of a lucid green; between these arise two, three, or four purplish stalks about eight or nine inches high, sustaining toward the top five or six Star-flowers, which come out singly from the side of the stalk; they are of a Violet blue colour, having a prominent germen in the center, supporting a slender style, and attended

by six slender stamina terminated by purple summits. It flowers in April, and the seeds ripen in June.

The sixth sort is commonly known in the gardens by the title of early starry Hyacinth. There are two varieties of this, one with a deep blue, and the other with a white flower; these grow naturally in some parts of France and Germany. The roots are solid, roundish, and about the size of a nutmeg, from which comes out a slender channelled stalk about six inches high, having generally two leaves near the bottom, one situated above the other, which embrace the stalk with their base; these are about six inches long, and almost three quarters of an inch broad, channelled, and of a bright green. The flowers are thinly placed toward the top of the stalk; the lower ones have foot-stalks an inch and a half long, but those of the others shorten gradually to the top; they are composed of six petals spreading open in form of a star, having a turgid germen in the center, supporting a short style, attended by six stamina, which in the blue flowers are of the same colour, and those in the white flowers are white. The flowers appear in March, and are succeeded by roundish three-cornered capsules having three cells, filled with brownish seeds.

The seventh sort is the small autumnal starry Hyacinth, which grows naturally in several parts of England, particularly on St. Vincent's Rock near Bristol, at the Lizard Point in Cornwall, and upon Blackheath in Kent; this hath a round, white, bulbous root, from which come forth a few rushy leaves about six inches long. In the center of these arise one or two slender stalks about six or seven inches high, naked, and sustaining a small corymbus of flowers at the top, which are small, star-pointed, and of a pale blue colour; these appear the beginning of September, at which time the leaves come out, and continue growing all the winter, and in the spring they die away.

The eighth sort grows naturally in Spain and Portugal; this hath an oblong, white, bulbous root, from which come out five or six leaves a foot long, and half an inch broad, of a lucid green, and a little keeled. The flower-stalk rises nine or ten inches high, is firm, and sustains many starry flowers at the top, disposed in a loose panicle, each standing upon a pretty long foot-stalk which is erect, but the flower nods on one side; they are of a deep blue Violet colour, having a prominent germen, which afterward turns to a three-cornered capsule having three cells, filled with roundish seeds. It flowers in May.

The ninth sort grows naturally in Italy; this hath a solid, white, bulbous root, from which rise several leaves like those of the common sort. The stalk rises ten or eleven inches high, and is terminated by a conical racemus of flowers, which are of a deep purple colour. This sort flowers in May, and the seeds ripen in July.

The tenth sort has a very large bulbous root, from which come out several leaves which at first are upright, but afterward bend toward the earth; they are of a thick substance and keeled; they are of a lucid green, and when broken yield downy threads; they are a foot and a half long, and more than an inch broad. Between the leaves arises the flower-stalk, which is a foot and a half long, round, firm, and naked, sustaining at the top a large cluster of flowers, which are gathered into an hemispherical corymbus: these have six petals which spread open in form of a star; they are of a purple colour, and have blue bottoms, and a dark blue vein running lengthwise in the middle of each petal. This flowers the beginning of June, and produces seeds which ripen in August.

There is another sort of this which grows naturally in the Levant, whose leaves are shaped like those of the Peruvian Hyacinth, but are longer, and stand erect; this propagates very fast by offsets, but never flowers here, I have kept the roots in all situations

tions more than thirty years, and have not seen one flower.

These plants are all of them hardy, and may be propagated by seeds or offsets, the latter being the more expeditious way is generally practised. The roots may be transplanted after the leaves are decayed, but, if they are removed after they have put out new fibres, they rarely succeed, at least they will not flower the following spring; they may be treated in every respect like the ordinary kinds of Hyacinths.

If they are propagated by seeds, they should be sown in autumn soon after they are ripe, either in shallow boxes or pans in the same manner as has been before directed for Hyacinths, to which the reader is desired to turn, to avoid repetition.

SCLAREA. Tourn. Inst. R. H. 179. tab. 82. *Salvia*. Lin. Gen. Plant. 36. [This plant is so called of σκληρός, hard, because it has a hard and dry stalk.] Clary; in French, *Toute-bonne*.

The CHARACTERS are,

The empalement of the flower is tubulous, of one leaf, which widens at the top, and has five acute points at the brim; it is of the lip kind, with one petal having a crooked tube, which enlarges at the chaps, where it is divided into two lips; the upper lip is erect and arched, the under lip is cut into three segments, the middle one being largest and hollowed like a spoon; it has but two stamina which appear, and are situated under the upper lip, terminated by oblong erect summits, and a four-pointed germen, supporting a forked style longer than the upper lip, crowned by a bifid stigma. The germen afterward become four roundish seeds which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's second class, which includes those plants whose flowers have two stamina and one style.

And he has joined this genus, and also the *Horminum* to the *Salvia*, the characters of each agreeing so well as to admit of their being joined; but in a book of gardening it would not be so well understood, which has occasioned my separating them again.

The SPECIES are,

1. **SCLAREA** (*Vulgaris*) foliis rugosis cordatis oblongis villosis ferratis, bracteis floribus calyce longioribus concavis acuminatis. Clary with rough, oblong, heart-shaped, sawed leaves, and the bractea among the flowers concave, pointed, and longer than the empalement. *Sclarea*. Tab. Icon. 373. Common Clary.
2. **SCLAREA** (*Æthiopis*) folis oblongis erosis lanatis, verticillis lanatis. Clary with oblong, hairy, eaten, woolly leaves, and the whorls of the flowers covered with down. *Sclarea vulgaris lanuginoso amplissimo folio*. Tourn. Inst. R. H. 179. Common woolly Clary with the largest leaf.
3. **SCLAREA** (*Lusitanica*) foliis oblongo-ovatis dentato-ferratis tomentosis, verticillis lanatis sessilibus. Clary with oblong oval leaves which are woolly and indented like a saw, and woolly whorls of flowers sitting close to the stalk. *Sclarea Lusitanica glutinosa, amplissimo folio*. Tourn. Inst. 179. Clammy Portugal Clary with a very large leaf.
4. **SCLAREA** (*Pratensis*) foliis cordato-oblongis crenatis summis amplexicaulibus, verticillis subnudis, corollarum galeis glutinosis. Clary with oblong, heart-shaped, crenated leaves, those on the top embracing the stalk, almost naked whorls, and the helmet of the flower glutinous. *Sclarea pratensis, foliis ferratis, flore cæruleo*. Tourn. Inst. 180. Meadow Clary with sawed leaves and a blue flower.
5. **SCLAREA** (*Syriaca*) foliis lanceolatis obsoletè crenatis subtus tomentosis, verticillis minoribus subnudis. Clary with spear-shaped leaves which are slightly crenated, and woolly on their under side, and very small whorls of flowers which are almost naked. *Sclarea Syriaca, flore cæruleo*. Tourn. Inst. 180. Syrian Clary with a blue flower.
6. **SCLAREA** (*Nemerosa*) foliis cordato-oblongis crenatis glabris, floribus verticillato-spicatis. Clary with oblong, heart-shaped, crenated, smooth leaves, and spiked whorled flowers. *Sclarea folio salviæ minor, five glabra*.

Tourn. Inst. 180. *Smaller Clary with a smooth Sage leaf*.

7. **SCLAREA** (*Sylvestris*) foliis cordato-lanceolatis acutis, bracteis coloratis, flore brevioribus. Clary with heart-shaped acute-pointed leaves, and coloured bractea which are shorter than the flower. *Sclarea folio salviæ major, vel maculata*. Tourn. Inst. 180. Clary with a greater, or spotted Sage leaf.
 8. **SCLAREA** (*Ceratophylla*) foliis rugosis pinnatifidis lanatis, verticillis summis sterilibus. Clary with rough, wing-pointed, woolly leaves, whose upper whorls are barren. *Sclarea rugoso verrucoso & laciniato folio*. Tourn. Inst. R. H. 180. Clary with rough, warted, cut leaves.
 9. **SCLAREA** (*Indica*) foliis cordatis acutè crenatis, summis sessilibus, verticillis subnudis remotissimis. Clary with heart-shaped leaves which are sharply crenated, those on the top sitting close to the stalks, and naked whorls placed far asunder. *Sclarea Indica, floribus variegatis*. Tourn. Inst. 179. Indian Clary with variegated flowers.
 10. **SCLAREA** (*Orientalis*) foliis lanceolatis acuminatis, ferratis, summis sessilibus, floribus verticillato-spicatis. Clary with spear-shaped, acute-pointed, sawed leaves, the upper one sitting close to the stalks, and spiked whorled flowers. *Sclarea Orientalis, folio betonicæ acutissimo, comâ purpurascente*. Tourn. Cor. 10. Eastern Clary with an acute Betony leaf, and a purplish top.
 11. **SCLAREA** (*Glutinosa*) foliis cordato-lagittatis ferratis acutis. Clary with heart-shaped crenated leaves which are acutely sawed. *Horminum luteum glutinosum*. C.B.P. 238. Yellow glutinous Clary.
 12. **SCLAREA** (*Tuberosa*) foliis cordato-ovatis rugosis tomentosis, calycibus hispidis, radice tuberosâ. Clary with oval, heart-shaped, rough, woolly leaves, prickly empalements, and a tuberous root. *Sclarea asphodeli radice*. Tourn. Inst. R. H. 179. Clary with an Asphodel root.
 13. **SCLAREA** (*Tomentosa*) foliis hastato-triangularibus obsoletè crenatis, caule tomentoso paniculato. Clary with triangular halbert-pointed leaves which are slightly crenated, and a woolly paniculated stalk. *Sclarea folio triangulari, caule tomentoso*. Tourn. Inst. 180. Clary with a triangular leaf and a woolly stalk.
 14. **SCLAREA** (*Mexicana*) foliis obtusis erosis, staminibus corollâ duplo longioribus. Prod. Leyd. 309. Clary with obtuse bitten leaves, and stamina twice the length of the petal of the flower. *Sclarea Mexicana altissima, facie heliotropii*. Hort. Elth. 339. Tallest Mexican Clary, with the appearance of Turnsol.
 15. **SCLAREA** (*Argentea*) foliis dentato-angulatis lanatis, verticillis summis sterilibus, bracteis concavis. *Sclarea with angular, indented, woolly leaves, concave bractea, and the upper whorls of flowers barren*. *Æthiopis tota argentea Cretica lanuginosa*. Hort. Carrol. *Æthiopis with silvery woolly leaves*.
- The first sort grows naturally in Syria, but has been long cultivated in the European gardens, both for the kitchen and shops; it is a biennial plant, which perishes after it has borne seeds. The lower leaves of this are large, rough, and wrinkled; they are oblong and heart-shaped; in good ground they are seven or eight inches long, and four broad at their base, ending in blunt points, and are sawed on their edges. The stalks are large, four-cornered, and clammy; they rise about two feet high, and are garnished at bottom with leaves of the same shape, but smaller; they send out small side branches which are opposite, as are also the leaves; the flowers are disposed in large loose spikes at the top of the stalks; they are placed in whorls round them, and are of a pale blue colour, having two short, hollow, acute-pointed leaves under each, which are thin, and of a whitish colour. The empalement of the flower is divided into two parts or lips, the upper ending in three, and the under in two spiculæ. The upper lip of the flower stands erect; it is long, and arched at the top, under which is the style which is nearly of the same length, and the two stamina, which are shorter, sit close

close to the style. After the flowers are past, the germen turn to four roundish seeds, which ripen in the empalement. The whole plant has a very strong scent; it flowers in June and July, and the seeds ripen in September.

It is propagated by seeds, which should be sown in the spring, and when the plants are fit to remove, they should be either transplanted into beds, or if a large quantity is required, they may be planted in an open spot of ground in rows two feet asunder, and one foot distance in the rows. After the plants have taken root, they will require no farther care but to keep them clean from weeds. The winter and spring following the leaves, which are the only part used, will be in perfection, and in the summer they will run up to flower, and after they have ripened their seeds decay, so that there should be annually young plants raised for use. It will thrive upon almost any soil that is not very wet, for in moist ground the plants frequently rot in winter.

The second fort grows naturally in Istria and Dalmatia; there are two varieties of this, one with very broad leaves which are but slightly indented on the sides, the other has longer leaves which are deeply jagged. The leaves of both forts are of a thick substance, and very woolly, especially on their under side; their upper sides are rugged and wrinkled like the first fort, and have several longitudinal veins, which diverge from the midrib. The stalks are square, and rise about two feet high, sending out many branches by pairs opposite, which are garnished in the first with entire, oval, acute-pointed leaves, which embrace the stalks with their base, but those of the other are long, narrow, and have several deep indentures on their edges. The upper part of the stalk and branches are garnished with spikes of flowers in whorls; under each of these whorls, are two hollow green leaves which are shorter than the empalements of the flowers; these empalements are divided into two lips, the upper ending in three, and the under in two spiculæ. The under lip or beard of the flower is white, and the helmet or galea is of a pale blue colour. This fort flowers and perfects its seeds at the same time as the first, and perishes soon after; it may be treated in the same way as the first.

The third fort has some resemblance of the second, but the leaves are larger, very woolly, and glutinous; they are oblong, oval, deeply indented in sharp points, and end with very acute points. The stalks are woolly, four-cornered, and rise about two feet and a half high, sending out side branches by pairs; these terminate in loose spikes of whorled flowers which are white, and the whorls are smaller than those of the other forts. It flowers and seeds about the same time as the former, and the plants soon after decay; it grows naturally in Portugal and also in Syria; it is propagated by seeds in the same way as the first.

The fourth fort grows naturally in some parts of France and Germany: it is generally found in meadows and rich pastures; this has a perennial root, composed of many strong ligneous fibres, from which come out many oblong heart-shaped leaves of a deep green colour, whose surfaces are rough; they are crenated on their edges, and stand upon pretty long footstalks. The stalks rise three feet high; they are four-cornered, and their lower parts are garnished with leaves whose base embrace them; the flowers grow in long whorled spikes at the top; they are smaller than those of the former forts, and are of a fine blue colour, having scarce any small leaves under the whorls. This flowers the latter end of May, and the seeds ripen in July; it is propagated by seeds, but the roots continue long.

The fifth fort grows naturally in Syria; this is an abiding plant, whose roots run deep in the ground. The leaves are spear-shaped; the lower ones are about four inches long, and an inch and a half broad in the middle; they are crenated on their edges, and a little woolly on their under side. The stalks are slender, stiff, and rise a foot and a half high; they are gar-

nished with smaller leaves of the same shape, set on by pairs; the flowers grow in small whorls, disposed in loose spikes at the top of the stalks; they are small, blue, and shaped like those of the other forts. This flowers in July, and the seeds ripen in autumn; it is propagated by seeds in the same way as the other forts.

The sixth fort grows naturally on the sides of highways about Vienna and all over Hungary; this has an abiding root, sending out many smooth leaves about the size and shape of those of broad-leaved Sage, but are indented on their edges. The stalks are slender, four-cornered, and rise a foot and a half high toward the bottom; they are garnished with smaller leaves; the upper parts are garnished with spiked small whorls of blue flowers which appear in June, and are succeeded by seeds which ripen in August. It is propagated by seeds in the same way as the first fort, but the roots will continue several years.

The seventh fort grows naturally in Austria and Bohemia; this has an abiding root, from which come out many heart spear-shaped leaves about four inches long, and one and a half broad; they are crenated on their edges, of a bright green colour, and have many white spots dispersed on their surface. The stalks are thick, four-cornered, and rise near three feet high, garnished below with leaves by pairs sitting close to the stalks, but their upper parts have long loose spikes of flowers in small whorls, whose bractæ are coloured. This flowers in June, and the seeds ripen in August; it is propagated by seeds as the former forts.

The eighth fort grows naturally in Syria; this is a biennial plant, which dies after it has borne seeds. The leaves of this fort are very thick and woolly; they are eight or nine inches long, narrow and wing-pointed, being cut into obtuse segments nearly opposite on their sides, almost to the midrib, somewhat like a stag's-horn in shape; these spread flat on the ground. The stalk rises more than a foot high; it is thick, four-cornered, and very woolly, sending out branches by pairs, and is garnished with narrow long leaves placed by pairs at each joint, which are sawed on their edges. The flowers grow in loose whorled spikes, but those are barren at the top of the stalks; they are white, and shaped like those of the fourth fort. This flowers in June, and the seeds are ripe in August; it may be propagated by seeds in the same way as the first fort, but should have a dry soil, otherwise the plants are apt to rot in winter.

The ninth fort grows naturally in India, but is hardy enough to live in the open air in England. The root of this will abide several years in a dry soil; the lower leaves are heart-shaped, acutely crenated on their edges, and of a thick consistence; they are seven or eight inches long, and four broad at their base, where they are eared. The stalk is four-cornered, and rises four feet high, having two or three pair of smaller leaves on the lower part, which stand opposite at the joints. The upper part of the stalk, for the length of two feet, is garnished with whorls of flowers which stand two or three inches distance from each other, having no leaves under the whorls. The empalement of the flower is hairy and blunt; the galea or helmet of the flower is arched, erect, and blue, terminating in a blue point; the two side segments of the under lip are of a Violet colour; the middle segment, which is indented at the point is white, and curiously spotted with Violet on the inside; the two side indentures turn yellow before the flower drops. When the flower is past, the germen turn to four large roundish seeds which ripen in the empalement. This fort flowers in May, and the seeds ripen in July; it is propagated by seeds in the same manner as the other forts.

The tenth fort grows naturally in the Levant, where it was discovered by Dr. Tournefort, who sent the seeds to the Royal Garden at Paris; this hath a perennial root, from which come out many spear-shaped leaves about four inches long, and one inch and a

half broad in the middle, of a dark green colour, sawed on their edges, and ending in acute points. The stalks rise three feet high, sending out branches by pairs their whole length; these are garnished with leaves by pairs, which toward the top fit close to the stalk. The flowers grow in whorled spikes at the top, having no leaves under them; they are small, of a bright blue colour, and the top of the spike is terminated with very deep blue flowers, which are barren; these appear in July, and are succeeded by seeds which ripen in September. It is propagated by seeds in the same manner as the other sorts, and the roots will abide many years.

The eleventh sort grows naturally in moist land both in Germany and Italy; this hath an abiding root, composed of strong ligneous fibres. The leaves are heart-shaped and pointed like a halbert; they are four inches long, and three broad at their base, of a pale yellowish green colour, and sawed on their edges, standing upon foot-stalks three or four inches long. The stalks are strong, four-cornered, and rise near four feet high; they are garnished below with smaller leaves, but the upper part of the stalk is closely set with whorls of large yellow flowers, which appear in June, and are succeeded by seeds which ripen in August. The whole plant is very clammy, and has a strong scent somewhat like the first species; this is propagated by seeds in the same way as the other sorts; it is very hardy, and will continue several years, and may be increased by parting of the roots in autumn.

The twelfth sort grows naturally in Italy; this has large swelling roots like dugs, or those of the Piony, from which arise many oval heart-shaped leaves lying on the ground; they are five or six inches long, and almost four broad at their base, where they are eared; they have pretty long foot-stalks, and are hairy; their edges are indented and a little wrinkled. Between these arise strong four-cornered stalks about four feet high, garnished with leaves placed opposite. The upper part of the stalk is garnished with loose spikes of whorled flowers, of a purple colour, which appear in June, and are succeeded by seeds which ripen in autumn. This is propagated by seeds in the same way as the other sorts, and the roots will continue several years.

The thirteenth sort grows naturally in the Canary Islands; this hath a perennial shrubby stalk which rises five or six feet high, dividing into many branches which are covered with a flocky down, and are garnished with halbert-shaped triangular leaves three inches and a half long, and one and a half broad at their base, where are two acute angular ears; they are placed opposite, standing upon long woolly foot-stalks. The top of the stalk branches out in many foot-stalks, forming a sort of panicle. The flowers are of a light blue colour, and are ranged in whorled spikes, having two small leaves under each whorl. This plant flowers from June to autumn, but rarely produces any seeds here. It is propagated by cuttings, which may be planted any time in summer; if these are planted in a bed of soft loamy earth, and covered close with a bell or hand-glass, observing to shade them from the sun, and refresh them with water as they may require it, they will take root very freely, then they must be inured to the open air; after they have put out good roots, they should be carefully taken up, and each planted in a separate small pot filled with light fresh earth, placing them in the shade till they have taken new root; then they may be placed among other hardy kinds of green-house plants in a sheltered situation till October, when they should be removed into shelter before hard frost comes on; but as they only require protection from hard frost, so they should have as much free air as possible in mild weather.

The fourteenth sort grows naturally in Mexico; this rises with a shrubby stalk eight or ten feet high, sending out slender four-cornered branches, of a purplish colour, garnished with oval leaves

which are pointed at both ends and sawed on their edges; they have long slender foot-stalks, are thin, of a pale green colour, and hairy on their under side. The flowers grow in close thick spikes at the end of the branches; they are of a fine blue colour, and appear in winter, so make a pretty variety in the green-house at that season. This plant never produces seeds in England, so it is only propagated by cuttings, which may be planted during any of the summer months, in the same manner as the former sort; and the plants may be treated afterward in the same way, with this difference, which is, to give it a dry situation in winter, for the young shoots are very apt to grow mouldy upon being in a damp air.

The fifteenth sort grows naturally in Sicily, and also in the Archipelago. This hath an abiding root, which in dry soils will live several years; the leaves are oval, of a thick consistence, and are very woolly, having several irregular indentures on their borders; the stalk rises near a foot and a half high, sending out two or four branches near the bottom, which grow erect; these are garnished with pretty large whorls of white flowers, which appear in June; those whorls on the lower part of the stalks are fruitful, but toward the top they are barren; the seeds of the fruitful flowers will ripen the beginning of August, which should be then gathered, otherwise they will drop.

This is propagated by seeds, which should be sown the beginning of April, in a dry or rubbishy soil, where the plants will live through the winter in the open air, and the second year will produce flowers and seeds.

There are some other sorts of less note, which are preserved in botanic gardens for the sake of variety; but those here mentioned are worthy of a place in large gardens, where, if they are intermixed among other large growing plants, they will afford a pretty variety, especially the fifth, eighth, tenth, and eleventh sorts, which produce long spikes of beautiful flowers, and continue a long time in flower. The flowers of the eleventh sort are used in Holland, to give a flavour to the Rhenish wines, which are brewed at Dordt. All these sorts may be propagated by sowing of their seeds upon a bed of fresh earth in March or April; and when the plants are come up, they should be transplanted into beds of fresh earth about eight inches asunder, observing to water them until they have taken root; after which they will require no farther care but to keep them clear from weeds until Michaelmas, when they should be transplanted into the places where they are to remain, placing them at a large distance, for they spread pretty far provided the soil be good. If so, they should be planted eight or ten feet distant, being intermixed with other plants. Some of these sorts will endure several years, provided they are planted on a fresh soil, not over moist or rich.

SCLERANTHUS, German Knot-Grass, or annual Knawel.

There are two species of this genus which grow naturally wild in England, so are rarely admitted into gardens, therefore I shall not trouble the reader with any farther account of them.

SCOLYMUS. Tourn. Inst. 480. tab. 273. Lin. Gen. Plant. 922. The Golden Thistle; in French, *Epine Jaune*.

The CHARACTERS are,

It hath a flower composed of many hermaphrodite florets, included in an oval imbricated empalement, having many loose sharp-pointed scales. The florets are tongue-shaped, of one petal, which is torn and slightly indented in five parts. They have five short hair-like stamina, terminated by tubulous summits. The germen is situated under the floret, supporting a slender style longer than the stamina, crowned by two reflexed stigmas. The germen afterward becomes a single seed, which is oblong, triangular, and ripens in the empalement, the seeds being separated by plain, roundish, indented chaff.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which contains those plants whose

whose flowers are composed of hermaphrodite fruitful florets, and the stamina and style are connected.

The SPECIES are,

1. SCOLYMUS (*Maculatus*) foliis margine attenuatis. Lin. Sp. Plant. 813. *Golden Thistle with leaves which are thinner on the borders.* Scolymus chrysanthemus annuus. Aët. Reg. Par. 111. *Annual Golden Thistle.*
2. SCOLYMUS (*Hispanicus*) foliis margine incrassatis. Lin. Sp. Plant. 813. *Golden Thistle with leaves which are thicker on the borders.* Scolymus chrysanthemus. C. B. P. 384. *Golden Thistle.*

The first sort grows naturally in the south of France and in Italy; this is an annual plant, which rises with a branching stalk four or five feet high, that have two leafy wings running along the sides from joint to joint; these are scolopped and indented; the borders of these are thinner than the other parts, and are armed all the way with very sharp spines; at each joint are placed stiff leaves, which are jagged and armed with strong spines; they are of a pale green, and sit close to the stalks. The flowers are produced at the top of the stalks inclosed in leafy involucrum, which are longer than the flowers, and are armed with very strong spines; within these are scaly empalements, which lie over each other like the scales of fish, and are armed with short spines. The flowers are composed of many golden florets, which do not appear till the middle or latter end of July; and unless the autumn proves warm and dry, the seeds do not ripen in England.

The second sort grows naturally in Spain and Sicily; this hath a perennial root, from which spring up many thick stalks that rise about three feet high, branching out on the sides the whole length, and are garnished with stiff jagged leaves, whose borders are thicker than the other part, and are armed with spines like the former sort; the stalks have leafy borders as the other, which are strongly armed with spines. The flowers are produced at the top of the stalks, and are shaped like those of the former sort. These appear in July, and if the season proves warm and dry, they will be succeeded by seeds which ripen in autumn.

They are propagated by seeds, which should be sown in March or April, on a bed of fresh undunged earth, in an open situation; and when the plants are come up, they should be kept clear from weeds; and where they grow too close, some of them should be pulled out, so as to leave those which are designed to remain about two feet asunder. This is all the culture which these plants require, for as they send forth tap-roots they do not bear transplanting well, therefore they must be sown where they are to remain; and if they are kept clear from weeds, they will thrive very well, and when the season proves dry, will perfect their seeds in autumn; but in wet seasons they rarely ever produce good seeds in England, which renders it difficult to continue the species, without procuring fresh seeds from abroad.

These plants are preserved by those persons who are curious in botany for variety's sake, but are rarely planted in other gardens.

SCOPARIA. Sweet-weed, or Wild Liquorice.

The CHARACTERS are,

It hath an empalement of one leaf, which is concave, and divided into four slender rough segments. The flower is of one petal, which spreads open, is concave, and divided into four segments, which are equal, obtuse, and bearded: it hath four awl-shaped stamina which are equal and shorter than the petal, terminated by simple summits; and a conical germen supporting an awl-shaped style longer than the corolla, crowned by an acute stigma; the germen becomes an oblong oval-pointed capsule with one cell, filled with oblong seeds.

This genus of plants is ranged in the first section of Linnæus's fourth class, which includes those plants whose flowers have four stamina and one style.

We have but one SPECIES at present in England, viz.

1. SCOPARIA (*Dulcis*) foliis ternis, floribus peduncula-

tis. Lin. Sp. 168. *Sweet Weed with three leaves surrounding the stalks, and flowers upon foot-stalks.* Veronica fruticosa erecto dulci hexangulari caule. Sloan. Hist. 1. p. 195. *Shrubby erect Speedwell, with an hexangular stalk.*

This plant in Europe is generally an annual, for after it has ripened its seeds it dies. It hath an hexangular stalk which rises near two feet high, sending out many branches which are garnished with three leaves placed round at each joint; these are about an inch long and a quarter of an inch broad, sawed on their edges, and of a deep green colour; the flowers come out from the side of the stalks at each joint, standing upon foot-stalks; they are small, white, and their petals have bearded threads on their edges; these are succeeded by capsules having one cell, opening with two valves, containing many oblong seeds.

It is propagated by seeds which should be sown upon a hot-bed in the spring; and when the plants are come up fit to remove, they should be planted upon a fresh hot-bed to bring them forward, observing to shade and water them until they have taken new root; after which, they should have the air admitted to them daily, according to the warmth of the season, and they must be frequently refreshed with water. In June they may be taken up with balls of earth to their roots, and planted into open borders, where they will flower, and perfect their seeds in the autumn, and soon after perish.

SCORDIUM. See TEUCRIUM.

SCORPIURUS. Lin. Gen. Plant. 886. Scorpioides. Tourn. Inst. R. H. 402. tab. 226. [so called, because the husk being wreathed, resembles the tail of a dragon: it is by some called Campoïdes, of Κάμπη, a canker-worm, and εἶδος, form.] Caterpillars; in French, *Chenille*.

The CHARACTERS are,

The empalement of the flower is of one leaf, and is erect, blown up, lightly compressed, ending in five acute points. The flower is of the butterfly kind; it has a roundish standard which is indented at the point, where it is reflexed and spreading. The wings are loose, almost oval, having obtuse appendages. The keel is halfmoon-shaped, the belly is gibbous, pointed, and erect, cut into two parts below. It hath ten stamina, nine joined and one separate, terminated by small summits; and an oblong taper germen a little reflexed, supporting a rising inflexed style, terminated by a point for a stigma. The germen afterward becomes an oblong, taper, leathery, rough, channelled pod, twisted in many longitudinal cells divided within, and on the outside contracted into knotty joints, each cell containing one seed.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which includes those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. SCORPIURUS (*Vermiculata*) pedunculis unifloris, leguminibus tectis undique squamis obtusis. Lin. Sp. Plant. 744. *Caterpillar with one flower upon a foot-stalk, and a pod covered with obtuse scales on every side.* Scorpioides filiquâ crassâ boelii. Tourn. Inst. 402. *Caterpillar with a thick pod.*
2. SCORPIURUS (*Muricata*) pedunculis bifloris, leguminibus extrorsum obtusè aculeatis. Lin. Sp. Plant. 745. *Caterpillar with two flowers on each foot-stalk, and the outside of the pods armed with blunt spines.* Scorpioides bupleuri folio filiquis lenibus. Park. 1117. *Caterpillar with a Hare's-ear leaf and a smother pod.*
3. SCORPIURUS (*Sulcata*) pedunculis subtrifloris, leguminibus extrorsum spinis distinctis acutis. Lin. Sp. Plant. 745. *Caterpillar with foot-stalks having three flowers, and the outside of the pods armed with sharp distinct spines.* Scorpioides bupleuri folio. C. B. P. *Caterpillar with a Hare's-ear leaf.*
4. SCORPIURUS (*Subvillosa*) pedunculis subquadrifloris, leguminibus extrorsum spinis confertis acutis. Lin. Sp. Plant. 745. *Caterpillar with four flowers sometimes upon a foot-stalk, and the outside of the pods armed with sharp spines which grow in clusters.* Scorpioides bu-

pleuri

pluri folio, corniculis asperis, magis in se contortis convolutis. Mor. Hist. 2. 127. *Caterpillar with a Hare's-ear leaf, and a rough pod greatly contorted and twisted.*

5. SCORPIURUS (*Pinnata*) foliis pinnatis. *Caterpillar with a winged leaf.* Scorpioides foliis vicinæ minima. Mor. Hist. 2. 127. *Smallest Caterpillar with a Vetch leaf.*

The first sort grows naturally in Italy and Spain; this is an annual plant, with trailing herbaceous stalks above a foot long; they lie upon the ground, and at each joint have one spatule-shaped leaf with a long foot-stalk. From the wings of the leaves come out the foot-stalks of the flowers, which are nine inches long, sustaining at the top one yellow butterfly flower, which is succeeded by a twisted thick pod, in size and appearance of a large green caterpillar, from whence it had this title. It flowers in July, and the seeds ripen in autumn.

The second sort has stronger stalks than the first; the leaves are much broader; the foot-stalks support two smaller flowers; the pods are slender, longer, and more twisted than those of the first, and are armed with blunt spines on their outside.

The third sort hath slenderer stalks than either of the former; the leaves stand upon shorter foot-stalks, but are shaped like those of the first sort; the foot-stalks of the flowers are slender, and frequently support three flowers; the pods are slender, not so much twisted as the former, and are armed on their outside with sharp distinct spines.

The stalks and leaves of the fourth sort are very like those of the first, but the foot-stalks of the flowers are longer, and each of them have three or four small yellow flowers at the top; the pods are very slender, greatly contorted, and armed with sharp spines in clusters on their outside.

The fifth sort has very short stalks; the leaves are winged; they are composed of four pair of small lobes, terminated by an odd one. The flowers are small, as are also their pods, which are less twisted than those of the three former.

All these plants are annual, and grow naturally in most of the warm countries in Europe, but the first sort has been long cultivated in the English gardens. These plants are preserved in several curious gardens, for their oddness more than for any great beauty: they are all of them annual plants, which are propagated by sowing their seeds upon a bed of light fresh earth; and when the plants are come up they should be thinned, so as to leave them about ten inches or a foot asunder, because their branches trail upon the ground; and if they have not room, they are apt to overbear each other, and thereby are very often rotted, especially in moist seasons. The weeds should also be diligently cleared from them, otherwise they will grow over and destroy them. In June these plants will produce small, yellow, papilionaceous flowers, which are succeeded by pods so much like caterpillars, that a person at a small distance would imagine they were real caterpillars feeding on the plants; and it is for this oddness of their pods, that these plants are chiefly preserved.

These plants seldom thrive well if they are transplanted; therefore the best method is, to put in three or four good seeds in each place where you would have the plants remain (which may be in the middle of large borders in the pleasure-garden, where, being intermixed with other plants, they will afford a pleasing variety.) When the plants come up, there should be only one of the most promising left in each place, which should be constantly kept clear from weeds; and when their pods are ripe, they should be gathered and preserved in a dry place till the following spring, in order to be sown.

The first sort is the best worth cultivating, the pods being large and more visible than the other, and are more in form of a caterpillar.

- SCORZONERA. Tourn. Inst. R. H. 476. tab. 269. Lin. Gen. Plant. 811. [of escorfa, a Catalonian word, signifying a viper, because it is said to be of

great efficacy against the bite of vipers. Authors write, that the herb, being applied, takes away the venom of the bite of vipers. They say, that if a viper be touched with its juice, it languishes; and that a man may touch vipers safely, if his hand be first dipped in the juice of this plant.] Viper's-grass; in French, *Scorzonere*.

The CHARACTERS are,

The common empalement is scaly, cylindrical, and imbricated. The flower is composed of several hermaphrodite florets, those on the outside being the longest; they are narrow, tongue-shaped, and indented in five parts. They have five short hair-like stamina, terminated by cylindrical summits. The germen is situated under the floret, supporting a slender style, crowned by two reflexed stigmas. The germen afterward turns to a single, oblong, channelled seed, crowned with a feathery down.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which includes those plants whose flowers are composed of hermaphrodite or fruitful florets, and their stamina and style are united.

The SPECIES are,

1. SCORZONERA (*Hispanica*) caule ramoso, foliis amplexicaulibus integris serrulatis. Hort. Cliff. 383. *Scorzonera with a branching stalk, whose leaves embrace them, which are slightly sawed.* Scorzonera latifolia sinuata. C. B. P. 275. *Common Viper's-grass.*
2. SCORZONERA (*humilis*) caule subnudo unifloro, foliis lato-lanceolatis nervosis planis. Hort. Cliff. 382. *Scorzonera with an almost naked stalk having one flower, and broad, spear-shaped, plain, veined leaves.* Scorzonera humilis latifolia nervosa. C. B. P. 275. *Dwarf Viper's-grass, with broad veined leaves.*
3. SCORZONERA (*Graminifolia*) foliis lineari-ensiformibus integris carinatis. Lin. Sp. Plant. 791. *Scorzonera with linear, sword-shaped, entire leaves, which are keeled.* Scorzonera Lusitanica, gramineo folio, flore pallidè luteo. Tourn. Inst. 477. *Portugal Viper's-grass with a Grass leaf, and a pale yellow flower.*
4. SCORZONERA (*Purpurea*) foliis lineari-subulatis integris planis pedunculis cylindricis. Lin. Sp. Plant. 791. *Scorzonera with linear, awl-shaped, entire, plain leaves, and cylindrical foot-stalks.* Scorzonera angustifolia subcærulea. C. B. P. 275. *Narrow-leaved Viper's-grass, with a flower almost blue.*
5. SCORZONERA (*Angustifolia*) foliis subulatis integris, pedunculo incrassato, caule simplicissimo basi villosa. Lin. Sp. Plant. 791. *Scorzonera with awl-shaped entire leaves, a thick foot-stalk, and the stalk hairy at its base.* Scorzonera humilis angustifolia pannonica. Clus. Hist. 2. p. 137. *Low, narrow-leaved, Hungarian Viper's-grass.*
6. SCORZONERA (*Laciniata*) foliis linearibus dentatis acutis, caule erecto squamis calycinis patulo-mucronatis. Lin. Sp. 1114. *Scorzonera with narrow, acute, indented leaves, and an erect stalk.* Scorzonera laciniatis foliis. Tourn. Inst. 477. *Viper's-grass with cut leaves.*
7. SCORZONERA (*Refedifolia*) foliis obtuse dentatis, caule prostrato calycum apicibus tomentosis. Lin. Sp. 1113. *Scorzonera with obtuse indented leaves, a prostrate stalk, and the tops of the calyx woolly.* Scorzonera foliis laciniatis supina. Bocc. Boerh. Ind. alt. 1. 89. *Low Viper's-grass with cut leaves.*

The first is the sort which is commonly cultivated in the English gardens for food and physic; this grows naturally in Spain. The root of this plant is Carrot-shaped, about the thickness of a finger, and covered with a dark brown skin; it is white within, and has a milky juice; the lower leaves are nine or ten inches long, and one and a half broad in the middle, ending with a long acute point. The stalk rises three feet high, it is smooth, branching at the top, and garnished with a few narrow leaves, whose base embrace the stalk. The flowers grow on the top of the stalks in scaly empalements, composed of many narrow, tongue-shaped, hermaphrodite florets, lying imbricatum over each other like the scales on fish; they are of a bright yellow colour, and appear in June and July. After these are decayed, the germen which sits

in the common empalement, turns to oblong cornered seeds, having a roundish ball of feathery down at the top.

The second sort is shorter than either of the former; the leaves are broader, the stalk is almost naked, and has one yellow flower at the top.

The third sort has narrow, keeled, sword-shaped leaves; the stalks are slender, they rise about two feet high, branch toward the top, and sustain pale yellow flowers, which are smaller than those of the former sorts.

The fourth sort has narrow awl-shaped leaves, which are shorter than those of the former; the stalk is taper, and branches at the top; the flowers are of a pale purple colour.

The fifth sort grows a foot and a half high; the leaves are narrow and awl-shaped; the foot-stalk immediately under the flower is thicker than below, and the lower part of the stalk is hairy; the flower is yellow.

The sixth sort rises with a smooth branching stalk two feet high, and is garnished with narrow leaves having many winged points, resembling those of Buck's-horn Plantain, but larger. The flowers are yellow, and stand upon long naked foot-stalks at the end of the branches.

The seventh sort is very like the sixth, excepting that of the stalks spreading on the ground, which is not accidental; the indentures on the leaves are more obtuse, and the tops of the cups are woolly. I have cultivated both sorts above thirty years, and have never found either of them alter.

The first sort is only cultivated for use, the others are preserved in botanic gardens for variety, but are seldom admitted into other gardens.

These plants may be propagated by sowing their seeds in the beginning of April, upon a spot of light fresh soil. The best method of sowing them is, to draw shallow furrows by a line about a foot asunder, into which you should scatter the seeds, thinly covering them over about half an inch thick with the same light earth; and when the plants are come up, they should be thinned where they are too close in the rows, leaving them at least six inches asunder; and at the same time, you should hoe down all the weeds to destroy them; and this must be repeated as often as is necessary, for if the weeds are permitted to grow among the plants, they will draw them up weak.

There are many people who sow their seeds promiscuously in a bed, and afterward transplant them out the distance they would have them grow; but this is not so well as the former method, because their roots commonly shoot downright, which, in being transplanted, are often broken, so that they never will make such fair roots as those which remain in the same place where they are sown; for when the extreme part of the root is broken, it never extends itself in length afterwards, but only shoots into many forked small roots, which are not near so valuable as those which are large and strait. These roots may be taken up when the leaves begin to decay, at which time they have done growing, though they may remain in the ground until spring, and may be taken up as they are used; but those which remain in the ground till March, will shoot up their flower-stems, after which they are not so good, being sticky and strong.

If you intend to save seeds of these plants, you should let a parcel of the best remain in the places where they grew; and when their stems are grown to their height, they should be supported with stakes, to prevent their falling to the ground, or breaking. In June they will flower, and about the beginning of August their seeds will ripen, when they should be gathered, and preserved dry till the spring following for use.

SCROPHULARIA. Tourn. Inst. R. H. 166. tab. 74. Lin. Gen. Plant. 674. [so called, on account of its resembling Scrophuli, by its inequality; not because it is good to cure the scrophula in the

neck, as is vulgarly thought.] Figwort; in French, *Scrofulaire*.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, cut into five parts at the top. It hath one unequal petal, with a large globular tube. The brim is cut into five small parts; the two upper are large and erect, the two side ones spread open, and the under is reflexed. It has four slender deflexed stamina, two of which are the length of the petal, and two are shorter, terminated by twin summits; and an oval germen supporting a single style the length of the stamina, crowned by a single stigma. The germen afterward turns to a roundish-pointed capsule with two cells, which open at the top, and are filled with small seeds.

This genus of plants is ranged in the second section of Linnæus's fourteenth class, which contains those plants whose flowers have two long and two shorter stamina, and their seeds are included in a capsule.

The SPECIES are,

1. **SCROPHULARIA** (*Nodosa*) foliis cordatis basi transversis, caule acutangulo. Lin. Sp. Plant. 863. *Figwort with heart-shaped leaves, whose base are transverse, and a stalk having acute angles. Scrophularia nodosa foetida. C. B. P. Figwort with a knobby root and a stinking smell.*
2. **SCROPHULARIA** (*Aquatica*) foliis cordatis petiolatis decurrentibus obtusis, caule membranis angulato, racemis terminalibus. Hort. Upsal. 177. *Figwort with heart-shaped leaves having running foot-stalks, and an angular membranaceous stalk, terminated by a racemus of flowers. Scrophularia aquatica major. C. B. P. 236. Greater Water Figwort, by some called Water Betony.*
3. **SCROPHULARIA** (*Sulphurea*) foliis cordato-oblongis, basi appendiculatis, racemis terminalibus. Lœff. Lin. Sp. Plant. 620. *Figwort with oblong heart-shaped leaves having appendages at their base, and stalks terminated by a racemus of flowers. Scrophularia aquatica, flore sulphureo. Michel. Water Figwort with a brimstone-coloured flower.*
4. **SCROPHULARIA** (*Cordato*) foliis cordato-sagittatis, acutè ferratis, racemis terminalibus. *Scrophularia with heart-shaped arrow-pointed leaves which are acutely sawed, and stalks terminated by a racemus of flowers. Scrophularia betonica folio. Tourn. Inst. R. H. 166. Figwort with a Betony leaf.*
5. **SCROPHULARIA** (*Scorodonia*) foliis cordatis duplicato ferratis racemo compositis. *Figwort with heart-shaped doubly-sawed leaves, and a compound racemus of flowers. Scrophularia melissæ folio. Tourn. Inst. R. H. 166. Figwort with a Baum leaf.*
6. **SCROPHULARIA** (*Italica*) foliis cordatis duplicato-ferratis, racemo composito. Flor. Leyd. Prod. 296. *Figwort with heart-shaped doubly-sawed leaves, and compound bunches of flowers. Scrophularia nemorensis, folio urticæ rugoso, flore atro-punicante. Hort. Cath. Wood Figwort with a rough Nettle leaf, and a dark red flower.*
7. **SCROPHULARIA** (*Trifoliata*) foliis glabris, inferioribus ternato-pinnatis obtusis, superioribus simplicibus, pedunculis subtrifloris axillaribus. Lin. Sp. 865. *Figwort with smooth leaves, the lower being winged and placed by threes, but the upper are single, and have foot-stalks with three flowers. Scrophularia Hispanica, sambuci folio glabro. Tourn. Inst. 166. Spanish Figwort with a smooth Elder leaf.*
8. **SCROPHULARIA** (*Sambucifolia*) foliis interrupte pinnatis cordatis inæqualibus, racemoso terminali, pedunculis axillaribus geminis dichotomis. Lin. Sp. 865. *Figwort with unequal heart-shaped leaves having interrupted wings, and flowers produced on forked foot-stalks by pairs. Scrophularia maxima Lusitanica, sambuci folio languinoso. Tourn. Inst. 167. Greatest Portugal Figwort with a woolly Elder leaf.*
9. **SCROPHULARIA** (*Canina*) foliis inferioribus pinnatis, summis integris duplicato-ferratis, racemis axillaribus. *Figwort with the lower leaves winged, those at the top entire, doubly sawed, and bunches of flowers at the wings of the stalk. Scrophularia ruta canina dicta vulgaris. C. B. P. 236. Common Figwort, called Dog's-rue.*

10. SCROPHULARIA (*Filicifolia*) foliis pinnatis, foliolis acutè dentatis, racemis terminalibus. *Figwort with winged leaves whose lobes are acutely indented, and bunches of flowers terminating the stalk.* Scrophularia folio filicis modo laciniatis, vel ruta canina latifolia. C. B. P. 236. *Figwort with leaves cut like Fern, or broad-leaved Dog's-rue.*
11. SCROPHULARIA (*Lucida*) foliis bipinnatis glaberrimis lucidis racemis bipartitis terminalibus. *Figwort with winged leaves which are smooth and shining, and stalks terminated by divided bunches of flowers.* Scrophularia laxatilis lucida, laserpitii Massiliensis foliis. Bocc. Mus. p. 2. 166. *Shining Rock Figwort, with leaves like Laserwort of Marseilles.*
12. SCROPHULARIA (*Orientalis*) foliis lanceolatis serratis, petiolatis caulinis ternis ramis oppositis. Lin. Sp. Plant. 864. *Figwort with spear-shaped leaves which are sharply sawed, those on the stalks placed by threes, and the branches opposite.* Scrophularia Orientalis, foliis cannabinis. Tourn. Cor. 9. *Eastern Figwort with leaves like Hemp.*
13. SCROPHULARIA (*Verna*) foliis cordatis, pedunculis axillaribus foliariis dichotomis. Hort. Cliff. 322. *Figwort with heart-shaped leaves, and single foot-stalks proceeding from the wings, and divided by pairs.* Scrophularia flore luteo. C. B. P. 236. *Figwort with a yellow flower.*
14. SCROPHULARIA (*Peregrina*) foliis cordatis, superioribus alternis, pedunculis axillaribus bifloris. Hort. Cliff. 322. *Figwort with heart-shaped leaves, the upper of which are alternate, and foot-stalks proceeding from the wings of the stalks, bearing two flowers.* Scrophularia urticae folio. C. B. P. 236. *Figwort with a Nettle leaf.*
15. SCROPHULARIA (*Pinnata*) foliis pinnatis, foliolis incisis, racemis simplicissimis terminalibus. *Figwort with winged leaves whose lobes are cut, and single bunches of flowers terminating the stalks.* Scrophularia Orientalis, chrysanthemi folio, flore minimo variegato. Tourn. Cor. 9. *Eastern Figwort with a Corn Marygold leaf, and the least variegated flower.*
16. SCROPHULARIA (*Marylandica*) foliis cordatis serratis acutis basi rotundatis, caule obtusangulo. Hort. Upf. 177. *Figwort with heart-shaped, acute, sawed leaves, which are rounded at their base, and obtuse angles to the stalks.* Scrophularia Marylandica, longo profundè ferrato urticae folio. Raii Suppl. 396. *Maryland Figwort with a long Nettle leaf which is deeply sawed.*
17. SCROPHULARIA (*Frutescens*) foliis lanceolatis obtusis ferrato-dentatis, pedunculis bifidis. Lin. Sp. Plant. 866. *Figwort with spear-shaped obtuse leaves which are indented, and bifid foot-stalks.* Scrophularia Lusitanica frutescens, verbenaceae foliis. Tourn. Inst. *Figwort with shrubby stalks and Vervain leaves.*
18. SCROPHULARIA (*Coccinea*) foliis quaternis ovatis, floribus verticillatis spicatis. Prod. Leyd. 294. *Figwort with oval leaves placed by fours round the stalk, and flowers in spikes.* Scrophularia flore coccinea, foliis urticae ternis caulem ambientibus. Houft. MSS. *Figwort with a scarlet flower, and leaves like those of the Nettle, placed by threes round the stalk.*
- The first fort grows naturally in woods and under hedges in most parts of England, so is seldom admitted into gardens; but being a medicinal plant, it is here mentioned to introduce the others. This hath a spreading root composed of many whitish knobs, from which arise several four-cornered stalks three feet high, which are garnished with heart-shaped leaves that are sawed on their edges, and have their base transverse; they are placed by pairs, and are of a dark green, or brownish colour on their upper side, but pale on their under, having an odour of Elder. The flowers are produced in small clusters from the sides of the stalks opposite, forming a kind of loose spike to the top; they are of one petal, of a dark purple colour, and shaped almost like a lip flower, the upper lip or crest being a little arched, the two side segments spread open, and the under segment is recurved. These appear in June, and are succeeded by roundish capsules ending in acute points, hav-

ing two cells filled with small seeds, which ripen in August.

The second fort grows naturally by the side of ditches and watery places in every part of England; this hath a fibrous root, sending out strong four cornered stalks, which grow near four feet high, garnished with heart-shaped leaves, which are rounded at their points and crenated on their edges, somewhat like those of Betony, from whence it has been titled Water Betony. The flowers are larger than those of the former, and are a little more coloured, but of the same shape, and appear at the same time. This fort is sometimes used in medicine, but as it grows wild by the sides of ditches, so it is seldom admitted into gardens. There is a variety of this with variegated leaves, which is by some preserved in gardens.

The third fort grows naturally in Italy and Spain, by the side of rivers and other moist places. The stalks of this are stronger, taller, and greener, than those of the former; the leaves have generally small appendages at their base; the flowers are greener, and grow thinner upon the stalks than those of the former, and in these particulars consist their differences.

The fourth fort grows naturally in Sicily; this hath a perennial fibrous root. The stalks rise near four feet high, and have sharp angles; the leaves are arrow-pointed, heart-shaped, and are sharply sawed on their edges; the flowers grow in loose bunches to the top of the stalks; they are in shape like those of the former, but are of a dark red colour.

The fifth fort grows naturally in Italy; it hath a perennial root. The stalks rise four feet high, and branch out on their side; they are garnished with heart-shaped sawed leaves, which on the upper part of the stalk are placed alternate. The flowers are produced in bunches at the wings of the stalk, each foot-stalk supporting two flowers; these are small, of a brown colour, and appear in June. The seeds ripen in August.

The sixth fort grows naturally in Sicily; this hath a perennial root. The stalks rise four feet high, and are garnished with heart-shaped leaves which are doubly sawed on their edges; the flowers are disposed in compound spikes, which sit upon long foot-stalks; these arise from the wings of the stalks, and have generally two narrow leaves placed at their base, but the flowers terminate the stalks like the three first forts.

The seventh fort grows naturally in Spain; this hath a perennial root. The leaves at the bottom are irregularly cut, and have two appendages at their base; they are smooth, of a lucid green, and are sawed on their edges. The stalks rise four feet high; they are four-cornered, smooth, and garnished with oval leaves, some of which are entire, and others have small lobes or appendages at their base. The flowers grow from the wings of the stalks in clusters, each standing upon a separate foot-stalk; they are of a bright red colour with greenish bottoms, and are much larger than either of the former. It flowers the beginning of June, and the seeds ripen in August.

The eighth fort grows naturally in Portugal; this resembles the seventh, but the stalks are larger, rise higher, and are hairy. The leaves are much longer, and have four appendages, irregularly sawed on their edges, and running out into longer points; the flowers grow in compound bunches at the wings of the stalks; they are larger than those of the former fort, and have a greater mixture of green in them.

The ninth fort grows naturally in Italy; this hath a root composed of a few thick fleshy fibres. The stalks are slender, four-cornered, and rise about two feet high; the lower leaves are composed of several pinnæ or lobes which are sharply sawed, but those on the stalks are entire; on the lower part of the stalk they are placed opposite, but toward the top they are alternate and small. The flowers come out in bunches from the wings of the stalk; they are small, and of a dark purple

purple colour with a mixture of green; the seed-vessels are small and roundish. This flowers at the same time with the former.

The tenth fort grows naturally in Crete; this hath a root composed of fleshy fibres. The lower leaves are broad and jagged, not much unlike those of the Indian Scabious; the stalks rise near three feet high; they are four-cornered, green, and smooth, and are garnished with winged leaves having very long foot-stalks; they are composed of two or three pair of small lobes, terminated by a large one, which are acutely indented on their edges, and end in sharp points. The stalks are terminated by slender bunches of flowers which are situated sparsely; they are small, of a purplish colour at their rims, and are edged with white; they are succeeded by small roundish seed-vessels filled with very small seeds. It flowers in June, and the seeds ripen in September.

The eleventh fort grows naturally in the kingdom of Naples, where it is frequently found upon rocks and old stone walls; this is a biennial plant, which perishes after it has produced ripe seeds. The stalks rise fifteen inches high; they are thick, smooth, and have scarce any corners; the leaves are winged, narrow, and of a lucid green; they are thick, succulent, and divided into many small lobes which are again divided, and are wing-pointed; the flowers are produced in loose bunches on the sides and at the top of the stalk; they are of a dark brown colour, with a mixture of green, and are succeeded by pretty large roundish capsules, filled with angular dark-coloured seeds. It flowers about the same time as the former fort.

The twelfth fort grows naturally in the Levant; this hath a perennial creeping root. The stalks rise two feet and a half high; their lower parts are closely garnished with spear-shaped leaves which are sharply sawed, and cut at bottom; the upper part of the stalk is garnished with compound bunches of small brown flowers which appear in May, and are succeeded by small roundish capsules filled with small seeds, which ripen in July.

The thirteenth fort grows naturally in Helvetia; this is a biennial plant, which flowers and produces seeds the second year, and then decays. The lower leaves of this fort are four or five inches long, and three broad; they are heart-shaped, hairy, and of a pale green colour. The stalks rise three feet high, and are garnished with smaller leaves, of the same shape with those at bottom, placed by threes round the stalk; the flowers stand upon pretty long foot-stalks; three of these come out at each joint round the stalk, and support clusters of pretty large flowers of a pale yellow colour; these appear in April, and are succeeded by large oval capsules filled with small seeds, which ripen in June.

The fourteenth fort is a biennial plant which grows naturally in Italy. The leaves of this are heart-shaped, ending in acute points, and are sawed on their edges; they are of a lucid green, and on the upper part of the stalk are placed alternate; the foot-stalks of the flowers come out at the wings of the leaves; these each sustain two or three flowers, which are of a dark red or purple colour; they appear in May and June, and the seeds ripen in July and August, after which the plants die.

The fifteenth fort grows naturally in the Levant, and also upon Gibraltar hill; this is a biennial plant, generally dying soon after the seeds are ripe. The lower leaves of this fort are doubly winged, and the segments are variously cut and indented; the stalk is slender, and rises three feet high, the lower part of which is garnished with smaller winged leaves, of a lucid green, which are indented and sit close to the stalks; the upper part has very slender bunches of small flowers, coming out of the side quite to the end of the branches. The flowers are thinly ranged, they are very small, and of a purple colour with white borders; these appear in June and July, but unless the autumn

proves warm, they will produce no good seeds in England.

The sixteenth fort grows naturally in Portugal, where the stalks become woody, but in England they are generally killed in winter, unless the plants are preserved in shelter; the stalks are garnished with spear-shaped leaves which are bluntly sawed on their borders; the flowers are produced from the side of the stalks, where at each joint come out two foot-stalks. This hath dark herbaceous flowers which appear in June, and the seeds ripen in autumn.

The seventeenth fort grows naturally in Maryland; this hath a perennial fibrous root. The stalks are four-cornered; the leaves are heart-shaped, sharply sawed on their edges, and rounded at their base; the flowers are produced in bunches on the upper part of the stalk, and are like those of the first fort, but are of an herbaceous colour. This flowers in June and July, and the seeds ripen in autumn.

The eighteenth fort was discovered by the late Dr. Houttoun, growing naturally at La Vera Cruz in New Spain; this is a biennial plant. The stalk rises two feet high, and is garnished with oval acute-pointed leaves which are sawed on their edges, and sit close to the stalks; those at the bottom and top of the stalk are placed by pairs, but in the middle there are three or four leaves at each joint placed round the stalk; they are of a pale green colour, and at the top of the stalk the flowers are produced in roundish bunches; they are about the size of those of the first fort, and are of a fine scarlet colour. This fort flowered in the Chelsea Garden, but did not perfect its seeds.

These plants are propagated by seeds, which if sown in the spring, the plants seldom rise the same season. Some of them may come up in autumn, and others the spring following; but, if they are sown in autumn, soon after they are ripe, the plants will come up the spring following. These seeds may be most of them sown in the place where the plants are to remain, for the plants are in general all of them hardy enough to bear the cold of our ordinary winters in the open air (except the last fort, which is tender;) therefore when the plants come up, they will require no other care but to thin them where they are too close, and keep them clear from weeds. The second year the plants will flower and produce ripe seeds; after which those forts which are biennial will die, but the others will continue some years.

The seventh and eighth forts are ornamental plants, so may be allowed to have a place in the pleasure-garden, where, when the plants are strong, they will make a good appearance during their continuance in flower, which generally lasts two months, unless the season proves very hot and dry. The roots of these forts will abide many years, unless by a very severe winter they are destroyed; therefore it will be proper to put some of these plants in pots, which may be sheltered under a common frame in winter; but, as young plants flower stronger than the old ones, there should be a succession of them annually propagated by seeds.

The other forts are proper furniture for botanic gardens, but are seldom cultivated in any other. The ninth, tenth, eleventh, and sixteenth forts should have a dry soil, for as they naturally grow upon rocks and old walls, if they are in good ground, the plants will grow vigorous in summer, and thereby will be so replete with moisture, as that they are often killed by ordinary frosts, or rot with wet in winter; whereas in a poor dry soil, they are seldom injured by the cold in England.

The last fort is too tender to live through the winter in the open air in this country, but the seeds should be sown in pots in autumn, which may be sheltered under a common frame in winter, and in the spring plunged into a moderate hot-bed, which will bring them up. When these are fit to remove, as many of them as are required should be planted into

separate

separate small pots, and plunged into a very moderate hot-bed, shading them from the sun till they have taken new root; after which they must be gradually hardened to bear the open air, into which they may be removed the latter end of June, placing them in a sheltered situation, where they may remain till September, when they should be removed into shelter before any morning frosts come on, and in winter they must be placed in a stove, kept moderately warm, where they will thrive and produce flowers the following summer.

SCUTELLARIA. Lin. Gen. Plant. 653. Cassida. Tourn. Inst. R. H. 181. tab. 84. Skull-cap; in French, *La Toque*.

The CHARACTERS are,

The flower has a very short tubulous empalement of one leaf, whose brim is entire, having an incumbent scaly operculum which seems closed; it is of the lip kind, with a very short crooked tube, long compressed chaps, and a concave trifid upper lip, the middle segment being concave and indented, the two side ones plain. The under lip is broad and indented; it has four stamina hid under the upper lip, two of which are longer than the other, terminated by small summits, and a four-pointed germen supporting a slender style situated with the stamina, crowned by a single recurved stigma; the empalement afterward becomes a helmet-shaped capsule, including the four seeds which are roundish.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two shorter stamina, and are succeeded by naked seeds sitting in the empalement.

The SPECIES are,

1. SCUTELLARIA (*Peregrina*) foliis subcordatis ferratis, spicis elongatis secundis. Hort. Cliff. 317. Skull-cap with almost heart-shaped sawed leaves, and spikes of fruitful flowers. Cassida. Col. Ecph. 1. p. 187. Skull-cap.
2. SCUTELLARIA (*Cretica*) foliis cordatis obtusis obtusè-que ferratis, spicis villosa imbricatis bracteis setaceis. Prod. Leyd. 311. Skull-cap with woolly, obtuse, heart-shaped leaves which are bluntly sawed, and imbricated spikes of flowers. Cassida Cretica fruticosa, catarixæ folio flore albo. Tourn. Cor. 11. Shrubby Cretan Skull-cap, with a Cat-mint leaf and a white flower.
3. SCUTELLARIA (*Altissima*) foliis cordato-oblongis, acuminatis ferratis, spicis subnudis. Lin. Sp. Plant. 600. Skull-cap with oblong, acute-pointed, heart-shaped, sawed leaves, and almost naked spikes of flowers. Cassida Orientalis altissima, urticæ folio. Tourn. Cor. 11. Tallest Eastern Skull-cap with a Nettle leaf.
4. SCUTELLARIA (*Orientalis*) foliis incisif, subtus tomentosis, spicis rotundato-tetragonis. Hort. Upsal. 173. Skull-cap with cut leaves which are woolly on their under side, and round four-cornered spikes. Cassida Orientalis Chamædyros folio, flore luteo. Tourn. Cor. 11. Eastern Skull-cap, with a Germander leaf and a yellow flower.
5. SCUTELLARIA (*Integrifolia*) foliis sessilibus ovatis, interioribus obsoletè ferratis, superioribus integerrimis. Lin. Sp. Plant. 599. Skull-cap with oval leaves sitting close to the stalks, the under of which are sometimes sawed, and the upper entire. Cassida folio melissæ, flore purpureo, longiore. Boerh. Ind. alt. 1. 177. Skull-cap with a Baum leaf, and a longer purple flower.
6. SCUTELLARIA (*Lupulina*) foliis cordatis incisif-ferratis utrinque glabris, spicâ rotundato-tetragonâ. Hort. Upsal. 173. Skull-cap with sawed cut leaves which are smooth on both sides, and a roundish four-cornered spike of flowers. Cassida Alpina supina, magno flore. Tourn. Inst. R. H. 182. Low Alpine Skull-cap with a large flower.

There are some other species of this genus, which are plants of little beauty, so are seldom admitted into gardens, for which reason they are not enumerated here.

The first sort grows naturally in Italy. Mr. Ray observed it about Leghorn and Florence, in the hedges and uncultivated places in plenty: this hath a perennial root. The stalk is four-cornered, hairy, and

rises two feet high; it is garnished with leaves placed opposite, which are almost heart-shaped and sawed on their edges. The flowers grow in long fruitful spikes at the top of the stalks; they are of a purple colour in some, and in others they are white; these appear in June, and after they decay, the empalement, which represents a helmet, contains four roundish seeds which ripen in August.

The second sort grows naturally in Crete; this hath a ligneous stalk which rises about two feet high, sending out slender side branches, garnished with obtuse heart-shaped leaves, which are bluntly sawed on their edges; they are hoary on their under side, and of a light green on their upper. The flowers are disposed in pretty long spikes at the top of the stalks; they are white, and have small leaves growing between them. This flowers in July, and the seeds ripen in autumn.

The third sort grows naturally in the Levant; this hath a perennial root. The stalks rise from three to four feet high, sending out a few slender branches from their sides; they are garnished with oblong heart-shaped leaves, ending in acute points, which are sawed on their edges. The flowers are disposed in naked spikes at the top of the stalks; they are purple, and have longer tubes than any of the other sorts. This flowers about the same time as the former.

The fourth sort grows naturally in the Levant; this is a perennial plant, with shrubby stalks which spread on the ground, and divide into small branches which are garnished with cut leaves placed opposite; they are almost triangular, of a light green on their upper side, and downy on their under, standing upon slender foot-stalks. The flowers are disposed in short four-cornered spikes at the end of the branches; they are of a bright yellow colour, and are succeeded by gray seeds which ripen in the empalement. This plant begins to flower the latter end of May, and there is commonly a succession of flowers on the same plant upward of two months.

The fifth sort grows naturally in North America; it has a perennial root, from which come forth several four-cornered stalks, which rise two feet high, sending out many side branches. The lower leaves are heart-shaped and sawed on their edges, standing upon pretty long foot-stalks; the upper leaves are oval and entire. The flowers are disposed in very long loose spikes at the end of the branches; they are of a purple colour, and appear the latter end of June; these are succeeded by seeds which ripen in September. The sixth sort grows naturally on the Alps and Apennines. The stalks of this are shrubby and trailing; the leaves are cut on their edges, and smooth on both sides; the flowers are disposed at the top of the stalks in roundish four-cornered spikes; in one they are white, and in another variety they are blue; they are larger than the flowers of any other known species, so make a pretty appearance in gardens. This flowers in June, July, and August, and the seeds ripen in autumn.

These plants are all of them propagated by seeds. If these are sown in autumn soon after they are ripe, they will more certainly succeed than when they are sown in the spring, for sometimes these miscarry, and, if they succeed, the plants seldom come up the same season. The seeds may either be sown where the plants are to remain, or in a border to be afterward removed; but, as the fourth sort does not bear transplanting well, unless they are removed young, the seeds of that had better be sown where the plants are to stand. This should be on a dry warm border of poor earth, where the plants will live much longer, and make a better appearance than on a rich soil, though they seldom continue more than two or three years. When the plants come up, they will require no other care but to thin them, and keep them clean from weeds.

When the other sorts come up, and are fit to remove, they may be transplanted into a nursery-bed at five or six

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fix inches distance, where they may stand till autumn, but must be kept clean from weeds during that time; then they may be transplanted into the borders of the flower-garden, where they are to remain.

As these plants are not of long duration, it will be proper to sow a succession of seeds every other year at least, to supply the places of those which decay.

SECALE. Tourn. Inst. R. H. 513. tab. 294. Lin. Gen. Plant. 92. Rye; in French, *Sègle*.

The CHARACTERS are,

There are two flowers in each involucre; they have two leaves which are opposite, narrow, erect, and sharp-pointed. The petals have two leaves; the outer valve is rigid, bellied, acute-pointed, and compressed; the lower border is hairy, ending in a long awn; the inner is plain and spear-shaped; they have two oval erect nectariums, and three hair-like stamina hanging without the flower, terminated by oblong forked summits, with a top-shaped germen supporting two reflexed hairy styles, crowned by a single stigma. The germen afterward becomes an oblong almost cylindrical seed, which ripens in the empalement.

This genus of plants is ranged in the second section of Linnæus's third class, which contains those plants whose flowers have three stamina and two styles.

We have but one distinct SPECIES of this genus which is cultivated in England, though it is often supposed the two varieties are essentially different; but from several years cultivating them on the same land, I could find no real difference between them. Dr. Linnæus titles this *Secale glumarum ciliis scabris*. Hort. Upsal. 22. *Rye with rough hairs to the awns*. *Secale hybernum vel majus*. C. B. P. *Winter or greater Rye*.

The farmers distinguish the two varieties by the titles of Winter and Spring Rye, but, when these are sown three or four years, at the same season, and on the same soil, it will be difficult to know them asunder; but, where Rye is sown upon a warm land, it will ripen much earlier than on cold stiff ground, and by continuing it two or three years, it will be forwarded so much, as to ripen a month earlier than the seeds which have long grown upon a strong cold soil; so those who are obliged to sow Rye toward spring, generally provide themselves with this early feed.

There are some kinds of Grass which are now ranged under this generical title, but as these do not merit cultivation, I shall not trouble the reader with the mention of them here.

Rye is so well known to every one who is the least acquainted with the different grains, as to need no description.

The Winter Rye is what the generality of farmers propagate; it is usually sown in autumn at the same season with Wheat, and in many of the northern counties, as also in Wales, they are often mixed together, though I think it must be very bad husbandry, for the Rye will always ripen sooner than Wheat; so that if the latter is permitted to be fully ripe, the former will shatter; nor can this be practised, where the people are not accustomed to eat Rye bread; for although it is by some accounted good when mixed, yet being so very clammy, few people who have been fed with Wheat, will ever care to eat bread made of this.

It is generally sown upon poor, dry, gravelly, or sandy land, where Wheat will not thrive, and in such places may answer very well; but on such land as will bear Wheat it is not proper to sow Rye, as the value of it is greatly inferior to that of Wheat.

When Rye is sown, the ground should not be too wet; and if it should happen that much rain falls before the Rye is come up, it often rots in the ground; but it is not long in coming up, it being much sooner out of the ground than Wheat.

The small Rye may be sown in the spring about the same time with Oats, and is usually ripe as soon as the other sort; but if the season proves wet, it is apt to run much to straw, and then the grain is generally lighter than the other; so the only use of this sort, is

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to sow upon such lands where the autumnal crop may have miscarried.

The general use of Rye is for bread, either alone, or mixed with Wheat; but (as was before observed) it is only fit for such persons who have been used to this food, few other persons caring to eat of it; nor have I ever heard of its having been exported, so can never be worth cultivating in general; though I have been informed it will yield a strong spirit, which perhaps may occasion its being more cultivated, since the pernicious use of spirituous liquors is now tolerated.

Rye is also sown in autumn to afford green feed for ewes and lambs in the spring, before there is plenty of Grass. When this is intended, the Rye should be sown early in autumn that it may have strength to furnish early feed. The great use of this is to supply the want of Turneps in those places where they have failed, as also, after the Turneps are over, and before the Grass is grown enough, to supply green feed for the ewes; so that in those seasons, when the Turneps in general fail, it is very good husbandry to sow the land with Rye, especially where there are stocks of sheep, which cannot be well supported, where green feed is wanting early in the spring; therefore those farmers who have large live stocks, should have several methods of supplying themselves with sufficient feed, lest some should fail; for as Turneps are a very precarious crop, some land should be sown with Cole-feed, which will supply the want of Turneps in winter; and if some of the ground, which was sown late with Turneps which had failed, was sown in autumn with Rye, that would be fit to supply the want of Cole-feed afterward.

SECURIDACA. Tourn. Inst. R. H. 399. tab. 224. Coronilla. Lin. Gen. Plant. 789. [so called from *securis*, Lat. a hatchet, because the ancients fancied the seeds of it resembled a hatchet.] Hatchet-vetch.

The CHARACTERS are,

The empalement of the flower is short, compressed, and of one leaf, cut into two segments which are erect. The flower is of the butterfly kind; the standard is heart-shaped, reflexed on both sides, and scarce longer than the wings; these are oval, joining at the top, but open at the bottom; the keel is compressed and pointed. It hath ten stamina, nine joined, and one separate, terminated by small summits, and an oblong compressed germen, with a bristly style, crowned by an obtuse stigma. The germen afterward turns to a long, compressed, sword-shaped pod, with a thick border on one side, plain on the other, opening in two cells, filled with square seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which contains those plants whose flowers have ten stamina joined in two bodies; he has also joined it to the genus of Coronilla.

We have but one SPECIES of this genus at present; which is,

SECURIDACA (*Lutea*) herbacea leguminibus falcato-glabris. *Herbaceous Hatchet-vetch, with hooked sword-shaped pods.*

This plant grows naturally in the Corn-fields in Spain and Italy; it is annual, and perishes soon after the seeds are ripe; this hath trailing herbaceous stalks which grow a foot and a half long, and divide into many branches which spread on the ground, and are garnished with winged leaves composed of seven or eight pair of oval obtuse lobes, terminated by an odd one; they are of a deep green and smooth. From the wings of the leaves arise the foot-stalks of the flowers; these come out by pairs opposite at each joint, are five or six inches long, sustaining at the top a large cluster of yellow flowers of the butterfly kind; these are succeeded by compressed pods four or five inches long, ending in acute points; they have a future on each side, one plain, and the other rising and thick; they are joined at their base to the foot-stalk, but spread open like the rays of a star, and are divided by a longitudinal partition into two cells, each containing a row of square flat seeds of a reddish colour. This

plant flowers in July, and the seeds ripen in autumn. It is propagated by sowing the seeds in borders of light fresh earth in the spring, in the places where the plants are to abide, for they seldom succeed well if they are transplanted; they should be allowed at least two feet distance, because their branches trail upon the ground. When the plants come up, they will require no other care but to thin them where they are too close, and keep them clean from weeds. A few of these plants may be admitted into every good garden for variety, though there is no great beauty in their flowers.

SEDUM. Lin. Gen. Plant. 513. Tourn. Inst. 262. tab. 140. Anacampseros. Tourn. Inst. 264. [so called from sedendo, Lat. sitting, because this plant does, as it were, sit upon the walls where it grows; or from sedando, appeasing, because it appeases the pains of inflammations.] Houseleek; in French, *Joubarbe*.

The CHARACTERS are,

The empalement of the flower is erect, acute, permanent, and cut into five segments. The flower has five plain, spear-shaped, acute-pointed petals which spread open, and five nectariums, with small single scales indented at the top; each being inserted at their base to the outside of the germen; it has ten awl-shaped stamens the length of the petals, terminated by roundish summits, and five oblong germen ending in slender styles, crowned by obtuse stigmas. The germen afterward become five erect spreading capsules which are compressed, acute-pointed, opening from top to bottom, and filled with small seeds.

This genus of plants is ranged in the fifth section of Linnæus's tenth class, which includes those plants whose flowers have ten stamens and five styles; and to this he joins the Anacampseros of Tournefort, making them but one genus.

The SPECIES are,

1. SEDUM (*Album*) foliis oblongis obtusis teretiusculis sessilibus patentibus, cymâ ramosâ. Hort. Cliff. 177. *Houseleek with oblong, obtuse, taper leaves sitting close to the stalks, spreading open, and a branching stalk. Sedum minus teretifolium album. C. B. P. 177. Stone Crop, or smaller Houseleek, with taper leaves and white flowers.*
2. SEDUM (*Dasyphyllum*) foliis oppositis ovatis obtusis carnosius, caule infirmo floribus sparsis. Lin. Sp. Plant. 431. *Houseleek with oval, fleshy, blunt leaves which are placed opposite, a weak stalk, and flowers growing thinly. Sedum minus, circinato folio. C. B. P. 223. Lesser Houseleek with a roundish leaf.*
3. SEDUM (*Rupestre*) foliis subulatis quinquefariam confertis basi solutis floribus cymosis. Hort. Cliff. 176. *Houseleek with awl-shaped leaves growing in clusters, whose base has a loose membrane, and flowers in bunches. Sedum minus à rupe St. Vincenti. Raii Syn. 2. 155. Lesser Houseleek, or Stone Crop of St. Vincent's Rock.*
4. SEDUM (*Hispanicum*) foliis teretibus acutis, radicalibus fasciculatis, cyma pubescente. Amœn. Acad. 4. p. 273. *Spanish Houseleek with acute taper leaves, those at the bottom growing in bunches, and the tips are hairy. Sedum Hispanum, folio glauco acuto, flore albido. Boerh. Ind. alt. 1. 287. Spanish Houseleek with a gray-coloured acute leaf, and a white flower.*
5. SEDUM (*Acre*) foliis subovatis adnato-fessilibus gibbis erectiusculis alternis, cymâ trifidâ. Hort. Cliff. 177. *Stone Crop with oval, gibbous, erect, alternate leaves sitting close to each other, and a trifid top. Sedum parvum acre, flore luteo. J. B. 3. 994. The common Stone Crop, or Wall Pepper.*
6. SEDUM (*Rubens*) foliis fuciformibus subdepressis, infimis quaternis, cyma subquadrifida, floribus pentandris, staminibus reflexis. Lin. Sp. Plant. 619. *Houseleek with depressed leaves, those at the bottom being ranged by fours; the flowers have but five stamens which are reflexed. Sedum arvense, flore rubente. C. B. P. 283. Field Houseleek with a red flower.*
7. SEDUM (*Annuum*) caule erecto solitario annuo, foliis ovatis sessilibus gibbis alternis, cymâ recurvâ. Flor. Suec. 319. *Houseleek with an erect, annual, single stalk, oval gibbous leaves which are placed alternate, and a recurved top. Sedum minimum non acre flore albo.*

Raii Syn. 2. p. 115. *The least Stone Crop, not biting with a white flower.*

8. SEDUM (*Reflexum*) foliis subulatis sparsis basi solutis, inferioribus recurvatis. Flor. Suec. 2. p. 1296. *Stone Crop with awl-shaped sparsed leaves, whose under ones are turned back. Sedum minus luteum, ramulis reflexis. C. B. P. 283. Smaller yellow Houseleek with reflexed branches.*
 9. SEDUM (*Sexangulari*) foliis subovatis adnato-fessilibus gibbis erectiusculis sexfariam imbricatis. Flor. Suec. 390. *Stone Crop with almost oval, gibbous, erect leaves growing close to each other, and imbricated six ways. Sempervivum minus vermiculatum. C. B. P. 204. Insipid Stone Crop.*
 10. SEDUM (*Villosum*) caule erecto, foliis planiusculisque subpilosis. Lin. Sp. Plant. 423. *Houseleek with an erect stalk, plain leaves, and foot-stalks which are somewhat hairy. Sedum palustre subhirsutum purpureum. C. B. P. 285. Hairy Marsh Houseleek with purple flowers.*
 11. SEDUM (*Stellatum*) foliis planiusculis angulatis, floribus lateralibus subfessilibus solitariis. Hort. Cliff. 176. *Houseleek with plain angular leaves, and single flowers sitting close to the sides of the stalk. Sedum echinatum, vel stellatum, flore albo. J. B. 3. 680. Prickly or starry Houseleek with a white flower.*
 12. SEDUM (*Cepæa*) foliis planis, caule ramosa, floribus paniculatis. Hort. Cliff. 176. *Houseleek with plain leaves, a branching stalk, and flowers growing in panicles. Sedum Cepæa dictum. H. L. B. Houseleek called Cepæa.*
 13. SEDUM (*Aizoon*) foliis lanceolatis ferratis planis, caule erecto, cymâ sessili terminali. Lin. Sp. Plant. 430. *Houseleek with plain, spear-shaped, sawed leaves, and an erect stalk terminated by a head of flowers sitting close to it. Anacampseros flore flavo. Amman. Ruth. 96. tab. 11. Orpine with a yellow flower.*
 14. SEDUM (*Telephium*) foliis planiusculis ferratis, corymbo folioso, caule erecto. Lin. Sp. 616. *Houseleek with plain sawed leaves, a leafy corymbus, and an erect stalk. Telephium vulgare. C. B. P. 287. Common Orpine, or Live-long.*
 15. SEDUM (*Hæmatodes*) foliis ovatis integerrimis, summis amplexicaulibus, corymbo terminali. *Houseleek with oval entire leaves which at the top embrace the stalk, and a corymbus of flowers terminating the branches. Telephium Lusitanicum hæmatodes maximum. H. R. Par. The greatest Portugal bloody Orpine.*
 16. SEDUM (*Anacampseros*) foliis cuneiformibus integerrimis, caulibus decumbentibus, floribus corymbosis. Lin. Sp. Plant. 430. *Houseleek with wedge-shaped entire leaves, trailing stalks, and flowers growing in a corymbus. Anacampseros minor, rotundiore folio, sempervirens. J. B. 3. 682. Smaller and rounder-leaved evergreen Orpine.*
- The first sort grows naturally upon old walls in many parts of England, so is seldom planted in gardens; but as it is a medicinal plant, I have placed it here; this hath slender trailing branches, which are garnished with taper succulent leaves about half an inch long, standing alternately round the branches. The flower-stalks rise four or five inches high; their lower part is garnished with leaves which spread out horizontally; the upper part of the stalk divides into small foot-stalks, supporting many white star-pointed flowers, gathered into a sort of umbel. These appear in July, and are succeeded by five-cornered capsules filled with small seeds which ripen in autumn.
- The second sort also grows upon old walls in many parts of England. The stalks of this are very slender and infirm; the leaves are very short, oval, and of a gray colour; they are placed by pairs opposite. The flowers are set thinly at the top of the stalks; they are small, white, and their petals are obtuse; the summits upon the stamens are pretty large, and of a bright purple colour. It flowers about the same time as the former.
- The third sort grows naturally upon St. Vincent's Rock near Bristol, and in several parts of Wales; this has slender purple stalks which trail upon the ground,

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ground, and are closely garnished with short awl-shaped leaves placed all round the stalks, which have a short loose membrane at their base, which falls off on being touched; the leaves toward the top of the stalk close together; they are of a sea-green colour, and not very succulent. The flowers grow at the top of the stalks in roundish bunches; they are of a bright yellow colour, and come out about the same time as the former. This plant, when it is once placed upon a wall, will propagate itself in plenty by its trailing branches, which put out roots from their joints.

The fourth sort grows naturally in Spain; this is an annual plant with upright stalks, which rise three or four inches high, garnished with fleshy awl-shaped leaves near an inch long, which spread out on every side; they are of a gray colour. The top of the stalk divides into two slender erect branches, which have small, white, star-pointed flowers ranged above each other, and the top of the stalk at the division of the branches is terminated by two or three flowers sitting close. This flowers in June, and the seeds ripen the beginning of August, which, if permitted to scatter, the plants will come up without care.

The fifth is the common Stone Crop or Wall Pepper, so called for the acrid biting quality of the leaves; this grows very common upon old walls and buildings in every part of England, and is so well known as to require no description. There are two varieties of it, one with large, and the other a small yellow flower.

The sixth sort grows upon moist rocks in several parts of France and Germany, and is seldom seen in gardens; this rises with an erect stalk about three inches high, garnished with obtuse, cylindrical, succulent leaves. The stalk divides upwards into three or four branches, which sustain small purplish flowers standing erect.

The seventh sort grows naturally on dry barren rocks in the north of England; this is an annual plant with an erect stalk, garnished with oval leaves placed alternate. The stalk seldom rises above two or three inches high; the leaves sit close to the stalks, and are of a grayish colour; the flowers grow at the top of the stalk in a reflexed spike; they are small and white.

The eighth sort grows naturally upon old walls and buildings in most parts of England, and is by some called Prick-madam; this has long trailing stalks, which are garnished with fleshy awl-shaped leaves, spreading out almost horizontally; they are of a gray colour, and end in acute points. The flowers grow in reflexed bunches at the top of the stalks; they are star-pointed, and of a bright yellow colour.

The ninth sort is less common than either of the former. I have found it growing upon the rocks in Wales. This hath the appearance of common Stone Crop, but the stalks and leaves are larger, and have no biting taste: the leaves are ranged in six rows, like the grains of the six-rowed Barley; the flowers are yellow, and larger than those of the common Stone Crop.

The tenth sort grows naturally upon moist rocks and boggy soils in several parts of the north of England and in Wales; this seldom rises more than two or three inches high. The stalks are garnished with a few plain hairy leaves, and are terminated by purple flowers growing thinly. It flowers in June.

The eleventh sort grows naturally in Italy and Germany; this is a low annual plant. The leaves are plain and angular; the stalks rise three inches high, dividing at the top into two or three parts; the flowers come out singly from the side of the stalk; they are white, star-pointed, and are succeeded by star-pointed rough capsules.

The twelfth sort is an annual plant, which grows naturally in the south of France and Italy; this hath plain succulent leaves. The stalks rise six or seven inches high, dividing into smaller branches, which sustain small white flowers growing in large panicles; these appear in June, and the seeds ripen the begin-

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ning of August, which, if permitted to scatter, the plants will come up without care. This loves a warm dry soil.

The thirteenth sort grows naturally in Siberia; this has a perennial root, composed of many thick fleshy fibres, from which come out several stalks which rise near a foot high, and are garnished with spear-shaped, plain, thick leaves, placed alternately on every side; they are two inches and a half long, and three quarters of an inch broad, and are slightly sawed on their edges. The stalk is terminated by a flat corymbus of flowers, which sit very close on the top; they are of a bright yellow colour, composed of five spear-shaped petals which are erect, and spread out at the top; the stamina are large, erect, and are terminated by oval sulphur-coloured summits. This flowers in June, and the seeds ripen in August.

The fourteenth sort is the common Orpine, which grows naturally in woods and shady places in many parts of England. Of this there are two varieties, one with white, the other with purple flowers. This has a perennial root composed of many glandulous knobs, from which come out round succulent stalks about two feet high, dividing toward the top into smaller branches; these are garnished with fleshy, oval, oblong leaves a little keel-shaped, which stand round the stalks without order; they are two inches long and one broad, of a gray colour, and sawed toward their points. The stalk is terminated by a corymbus of flowers which are star-pointed; in some they are white, and in others purple; they appear in July, and are succeeded by capsules filled with small seeds, which ripen in autumn.

This sort is used in medicine; it is vulnerary and astringent, and is greatly recommended for its wonderful virtue in easing of pains. The leaves, bruised and laid on the part, produce this effect both in green wounds and putrid ulcers; and, if applied to corns, will in a short time take them away.

The fifteenth sort grows naturally in Portugal; there are two varieties of this, one with white, and the other with purple flowers. The roots of this are composed of many thick fleshy knobs; the stalks are thick, succulent, and round; they rise near three feet high, and are garnished with oval succulent leaves which are entire; they are three inches long, and two inches and a quarter broad, placed by pairs, and those on the upper part embrace the stalk with their base; they are of a pale herbaceous colour. The flowers are collected in large bunches which terminate the stalks; these appear in July, and are succeeded by seeds which ripen in autumn.

The sixteenth sort grows naturally in Italy. The roots of this are fibrous; the stalks trail on the ground, and are garnished with wedge-shaped leaves standing alternately round the stalks; they are almost an inch long, and half an inch broad. The flowers are disposed in a compact corymbus, which sits close on the top of the stalks; they are star-shaped, of a purple colour, and appear in July. This plant is an evergreen, which renders it more valuable than the other sorts.

All the sorts of Stone Crop are easily propagated, by planting their trailing stalks either in spring or summer, which soon put out roots; but, as these thrive much better upon rocks, old walls or buildings, than in the ground, they may be disposed upon rock-work in such a manner as to have a good effect; and where there are unsightly buildings, their tops may be covered with these plants so as to hide their deformity: in such places, these plants will appear to greater advantage than on the ground. If the cuttings or roots of the perennial sort are planted in some soft mud laid upon the walls or buildings, they will soon take root, and then spread into every joint or crevice, and in a short time will cover the place; or if the seeds of those annual sorts which grow naturally in dry places are sown soon after they are ripe on the top of walls, the plants will come up, and maintain themselves without farther care.

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The several sorts of Orpine may be easily propagated by cuttings during the summer months, or by parting of their roots either in spring or autumn; these thrive best in a dry soil and a shady situation, but may also be planted for the same purposes as the other sorts, especially the sixteenth sort, which is evergreen. The stalks of this kind hang down, and have a very good effect in rock-work, and the plants require no care; for when they are fixed in the place, they will spread and propagate fast enough.

The stalks of the common Orpine are frequently cut in summer, and fastened to laths of the size of chimney-boards, which being framed together, are used for screening the sight of the fire-grates in rooms; these stalks will shoot and spread over the frame, and if the frames are taken out once a week, and the stalks watered over to refresh them, they will continue in verdure for two months.

SEED: The Seed of a plant consists of an embryo with its coat or cover. The embryo, which contains the whole plant in miniature, and which is called the germ or bud, is rooted in the placenta or cotyledon, which makes the coat or involucre, and serves the same purposes as the secundines, i. e. the chorion and amnis in animals.

The placenta or cotyledon of a plant is always double, and in the middle and common center of the two is a point or speck, which is the embryo or plantule. This plantule, being acted on and moved by the warmth of the sun and the earth, begins to expand, and protrudes or shoots out its radicle or root both upward and downward. By this it absorbs the nutritious juice from the earth, and so grows and increases, and the requisite heat continuing, the growth continues.

Thus, e. g. a Pea or Bean being committed to the ground, is first found to cleave into two parts, which are, as it were, two leaves or lobes of the placenta, and in the fissure appears a point, which shoots out a root downward, and a bud upward; the first spreading itself in the soil to catch the moisture thereof, and the latter, mounting into the air, becomes the stem or body of the new plant.

It is very remarkable how the plumule, or future stem, should always get uppermost, and the radicle or root be turned downward, and this too perpendicularly to the horizon; and not only this, but if, by any external means, the stem be diverted from this perpendicular, and bent, for instance, toward the earth, instead of persevering in that direction, it makes an angle or elbow, and redresses itself.

The same is observed in trees, &c. blown down, with their roots by the wind, or in those planted in pots, upon turning the pots upon one side.

Now the Seed, from which a plant arises, being the plant itself in miniature, it is easy to suppose that, if it be deposited in the ground with the plumule perpendicularly upward, and the radicle downward, the disposition should be maintained in its future growth.

But it is known that Seeds, sown either of themselves, or by the help of man, fall at random, or among an infinite number of situations of the plumule, &c. The perpendicular one upward is but one, so that in all the rest it is necessary the stem and root each make a bend, to be able the one to emerge directly upwards, the other downward. Now what force is it that effects this change, which is certainly an action of violence?

Mr. Dodart, who first took notice of the phenomenon, accounts for it by supposing the fibres of the stem of such a nature, as to contract and shorten by the heat of the sun, and lengthen by the moisture of the earth; and on the contrary, the fibres of the root to contract by the moisture of the earth, and lengthen by the heat of the sun.

On this principle, when the plantule is inverted and the root a-top, the fibres of the root being unequally exposed to the moisture, viz. the lower parts more than the upper, the lower will contract, and this

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contraction be promoted by the lengthening of the upper from the action of the sun; the consequence whereof will be, the roots recoiling, insinuating farther into the earth, and getting beneath the body of the Seed.

In a word: the earth draws the root toward itself, and the sun promotes its descent; on the contrary, the sun draws up the plume, and the earth in some measure, sends it towards the same.

M. De la Hire accounts for the same perpendicularity, by only conceiving the root to draw a coarser and heavier juice, and the stem a finer and more volatile one. In the plantule therefore we may conceive a point of separation, such as, that all on one side, e. g. the radial part is unfolded by the grosser; and all on the other by more subtle juices.

If the plantule then be inverted, and the root a-top, as it still imbibes the grosser and heavier juices, and the stem the lighter; the point of separation being conceived as the fixed point of a lever, the root must descend, and at the same time that the volatile juices imbibed by the stem, tend to make it mount. Thus is the little plant turned on its fixed point of separation till it be perfectly erect.

The plant thus erected, M. Parent accounts for the stem's continuing to rise in the vertical direction, thus: the nutritious juice being arrived at the extremity of a rising stalk, and there fixing into a vegetable substance, the weight of the atmosphere must determine it to fix in a vertical position, so that the stalk will have acquired a new part of perpendicularity over the rest; just as in a candle, which held any how obliquely to the horizon, the flame will still continue vertical, by the pressure of the air.

The new drops of juice that succeed, will follow the same direction; and as all together form the stem, that must of course be vertical, unless some particular circumstances intervene.

And that, whereas the branches are likewise observed, as much as possible, to affect perpendicularity in most instances, inasmuch, that though they be forced to shoot out of the stem horizontally, yet in their progress they erect themselves; M. Parent solves this, from the vertical tendency of the nutritious juice, up the stem; for the juice, being received in this direction into the new tender buds, finds at first little resistance; and afterwards as the branch grows firmer, it furnishes a longer arm of a lever to act by.

Mr. Astruc accounts for the perpendicular ascent of the stem, and their redressing themselves when bent, on these two principles.

1. That the nutritious juice arises from the root to the top in longitudinal tubes, parallel to the side of the plant, which communicates either by themselves, or by means of other horizontal tubes, proceeding from the circumference of the plant, and terminated in the pith.

2. That fluids contained in tubes, either parallel or oblique to the horizon, gravitate on the lower part of the tubes, and not at all on the upper.

From hence it easily follows, that in a plant posited either obliquely or parallel to the horizon, the nutritious juice will act more on the lower part of the canals than the upper; and by that means insinuate more into the canals communicating therewith, and be collected more copiously therein; thus the parts on the lower side will act more on the lower part, and will receive more accretion, and be more nourished than those on the upper; the consequence whereof must be, that the extremity of the plant will be obliged to bend upward.

The same principle brings the seed into its due situation at first. In a Bean planted upside down, the plume and radicle are easily perceived with the naked eye, to shoot at first directly for about an inch; but thenceforth they begin to bend, the one downward, and the other upward.

The two placentalæ or cotyledons of a seed are, as it were, a case to this little tender plantule or point, covering it up, sheltering it from injuries, and feeding

it from their own proper substance ; which the plantule receives and draws to itself, by an infinite number of little filaments or ramifications, called funes umbilicales, or navel-strings, which it sends into the body of the placenta.

The cotyledons, for the most part, abound with a balsam disposed in proper cells ; and this seems to be oil brought to its greatest perfection, while it remains humid, and then lodged in these repositories ; one part of the composition of this balsam is oily and tenacious, and serves to defend the embryo from any extraneous moisture, and by its viscosity, to entangle and retain that fine, pure, volatile spirit, which is the ultimate production of the plant.

This oil is never observed to enter into the vessels of the embryo, which are too fine to admit so thick a fluid, but this serves to preserve the growing quality of the seed. The spirit, however, being quickened by an active power, may possibly breathe a vital principle into the juices that nourish the embryo, and stamp upon it the character that distinguishes the family ; after which every thing is changed into the proper nature of that particular plant. That this spirit now is truly the efficacious part, is evident, for when that is gone off, the oil that remains is quite vapid and inactive. It is this that gives plants their fragrant smell and peculiar tastes, nor do their particular colours a little depend upon it.

Now when the Seed is committed to the earth, the placenta still adheres to the embryo for some time, guards it from the access of noxious colds, &c. and even prepares and purifies the cruder juice the plant is to receive from the earth, by straining it, &c. thro' its own body.

This it continues to do, till the placentula being a little inured to its new element, and its root tolerably fixed in the ground and fit to absorb the juice thereof, it then perishes, and the plants may be said to be delivered ; so that nature observes the same method in plants contained in fruits, as in animals in the mother's womb.

It is very surprising, how many sorts of Seeds will continue good for several years, and retain their growing faculty, whereas many other sorts will not grow when they are more than one year old ; which is, in a great measure, owing to their abounding more or less with oil, as also the nature of the oil, whether it is of a cold or hot quality, and the texture of their outward covering. As for example ; the Seeds of Cucumbers, Melons, and Gourds, which have thick horny coverings, and the oil of this Seed being of a cold nature, continue good eight or ten years ; and Radish, Turnep, Rape, &c. with other oily Seeds (whose coats, though they are not so hard and close as the others, yet) abounding with oil, which is of a warmer nature, the Seeds will keep good three or four years ; whereas the Seeds of Parsley, Carrots, Parsneps, and most other umbelliferous plants, whose Seeds are, for the most part, of a warm nature, and have little oil in them, lose their growing faculty often in one year, but seldom remain good longer than two years. Indeed all sorts of Seeds are preserved best, if kept in the pods or husks wherein they grow ; especially if they are not separated from the placenta, to which they are fastened by an umbilical cord, thro' which they received their nourishment in their embryo state ; so that whoever would send Seeds to a distant country, should always take care they are full ripe before they are gathered, and that they are preserved in their pods or husks ; and when they are packed up for exportation, there should be great care taken, that they are not shut up too closely from the air ; which is absolutely necessary to maintain the principle of vegetation in the Seed (though in a less degree) as it is to nourish the plant when germinated, as I have found by trying the following experiment, viz. Having saved a parcel of fresh Seeds of several kinds, as Lettuce, Parsley, Onions, &c. I took a parcel of each kind, and put into glass phials ; these I stopped down close, and sealed hermetically, then

put them up in a trunk ; the other parts of the same seeds I put into bags, and hung them up in a dry room, where the air had free admittance, in which place they remained a whole year ; and in the following spring I took out a part of each parcel of seeds from the phials, as also from the bags, and sowed them at the same time, and upon the same bed where they had an equal advantage of sun, air, &c. The result of this experiment was, that almost all the seeds which I took out of the bags grew extremely well, but of those which were kept in the phials not one came up ; after which, I sowed the remaining part of the seeds in the phials, but had not one single plant from the whole, whereas those preserved in the bags grew very well both the second and third years. And this experiment was afterward tried by one of my particular friends, with whom the effect was the same as with me. And some years after this, a gentleman of great eminence for his knowledge of plants, being very desirous to procure Seeds from every country, where the British nation had any commerce, gave his instructions to all the agents abroad, to send him over all the sorts of Seeds they could collect in their different countries, and to put them up in bottles, sealing the mouths of the bottles as close as possible, to exclude the air ; which was done by several of his correspondents, who sent him great quantities of Seeds, but not one of them grew when they were sown ; so that those persons who send Seeds to a distant country, should never be guilty of the like error.

These experiments prove, that all Seeds require some share of fresh air, to keep the germen in a healthy state ; and that where the air is absolutely excluded, the vegetative quality of the Seeds will soon be lost ; therefore the anointing of the Seeds, or covering them over with fat or oil, should not be practised ; for as this will in a great measure shut up the pores of the Seeds, it will prevent the transpiration and inspiration of air, whereby the seeds will soon be spoiled.

The earth, which is the natural nurse to all Seeds, will preserve them much longer than any other body, provided they are buried so deep, as to be beyond the influence of sun and showers, whereby they are prevented from vegetating. I have known seeds of several plants remain buried three feet deep above twenty years, and when turned up to the air, have grown as well as fresh Seeds ; and a particular friend of mine shewed me a spot of ground, which was covered with Corn-fallad, the Seeds of which he assured me had been buried thirty-two years in that place, and when turned up again to the air, were as productive as new Seeds.

How the vegetative life is so long preserved in Seeds, by being so deeply immersed in the ground, is very difficult to explain ; but as the fact is very notorious, it well accounts for the production of plants out of earth taken from the bottom of vaults, houses, and wells ; and from the earth which has been taken at a very great depth in those places, there have been many plants produced, which were not inhabitants of the neighbouring soil ; and this has been brought as a proof to support the doctrine of spontaneous productions, by some who have asserted, that plants are often produced without Seed.

The earth which has been brought to England, from very distant countries, having many of the Seeds of those plants which grew in those places buried therein, when this has been placed in a proper degree of heat and spread abroad, the Seeds have vegetated, and great numbers of plants have come up ; whereby many plants, which would have escaped the notice of those persons who collect Seeds to send to Europe, have been obtained.

A method for raising such Seeds which have hard coats or shells surrounding them, and that have been judged very difficult, if not impossible, to be raised in England.

In the year 1724, I had a parcel of fresh Cocoa-nuts given me, which were brought over from Barbadoes :

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part of these nuts I divested of their outward coat or husk, and the other part I left entire, as I received them.

Both these parcels I planted in large pots filled with good fresh earth, and plunged the pots into hot-beds made of tanners bark, giving them gentle and frequent waterings, as the earth in the pots seemed to require; but not one of the whole number had made any attempt to shoot, as I could perceive; and upon taking them out of the pots, I found they were rotten.

About four months after, I received another fresh parcel of Cocoa-nuts from Barbadoes, which I treated in another manner; from that part of these I cut off the outer coat or husk, and the other part I left entire, as before: but supposing it was owing to my planting the other parcel in pots, that they did not succeed, I made a fresh hot-bed with horse-dung, and covered it over with fresh earth about eighteen inches thick, in which I planted the nuts, observing, as before, to supply it with convenient moisture, as also to keep the hot-bed in an equal temper of heat, which I was guided to do by a thermometer, graduated for the use of hot-beds; but with all my care, I had no better success than before, not one of the nuts making any essay towards shooting.

The year following, I had another parcel of Cocoa-nuts given me, which, considering my former ill success, I planted in a different manner, as follows:

Having a hot-bed, which had been lately made with tanners bark, and which was filled with pots of exotic plants, I removed two of the largest pots, which were placed in the middle of the bed; and, opening the tanners bark under the place where the two pots stood, I placed the two Cocoa-nuts therein, laying them side-ways, to prevent the moisture (which might descend from the pots) from entering the hole at the base of the fruit, and thereby rotting the seminal plant upon its first germinating.

I then covered the nuts over with the bark two or three inches thick, and placed the two pots over them in their former station.

In this place I let the nuts remain for six weeks, when removing the two pots and uncovering the nuts, I found them both shot from the hole in the base of the fruit an inch in length, and from the other end of the fruit were several fibres emitted two or three inches in length.

Upon finding them in such a forwardness, I took them out of the bark, and planted them in large pots filled with good fresh earth, plunging the pots down to the rims in tanners bark, and covering the surface of the earth in the pots half an inch with the same; soon after which, the young shoots were above two inches long, and continued to thrive very well.

I communicated this method to some of my acquaintance, who have tried it with the same success; and if the nuts are fresh, scarce any of them miscarry. This led me to try, if the same method would succeed as well with other hard-shelled exotic seeds, which I could not, by any method I had before tried, get to grow; as the Bonduck or Nickar-tree, the Phaseolus Brasiliensis lobis villosis pungentibus, Maximus Hermanni, or Horse-eye Bean, with several others; and I have found it both a sure and expeditious way to raise any sort of hard-shelled fruit or seeds.

For the heat and moisture (which are absolutely necessary to promote vegetation) they here enjoy in an equal and regular manner, the tanners bark (if rightly managed) keeping near an equality of heat for three months; and the water which descends from the pots, when they are watered, is by the bark detained from being too soon dissipated, which cannot be obtained in a common hot-bed, the earth in such being worked away by the water, and thereby leaving the seeds often destitute of moisture.

Some of these Seeds I have had shoot in a fortnight's time, which, I am informed, would not have so done in a month, in their natural soil and climate.

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I have also found it an excellent method to restore Orange, or any other exotic trees, which have suffered by a tedious passage, in being too long out of the ground, by laying their roots and stems in a moderate tan-bed for three or four days before they are planted; insomuch that I recovered two Orange-trees, which had been ten months without either earth or water.

In the common method of sowing seeds, there are many kinds which require to be sown soon after they are ripe; and there are many others which lie in the ground a year, sometimes two or three years, before the plants come up; so that when the seeds which come from distant countries are sown, the ground should not be disturbed, but wait with patience, in expectation of the plants, at least two years; for it has often happened to seeds which I have sown, that have been brought from America, that part of them have come up the first season, some the next, and others not until the third year; so that if the ground had been disturbed, I should have lost many plants, which, by my waiting so long, came up and succeeded very well.

As there is such difference in the length of time, which some seeds will keep good over others, I thought it would not be unacceptable, if I should add an account of those seeds which require to be sown soon after they are ripe; and of others, how long they may be kept good, if they are carefully saved; which I have drawn out in the following table, which will, in a great measure, direct how those seeds, which are not here included, require to be treated.

The first class of seeds which I shall enumerate, is of those which should be sown in autumn, soon after they are ripe; otherwise many of them will not succeed, and others will often remain in the ground a whole season, if they are kept out of the ground till spring, whereby a full year will be lost.

Adonis, or Flos Adonis, see Adonis.

Alexanders, or Alissanders, see Smyrnium.

Anemony, or Windflower, see Anemone.

Angelica.

Arse-smart the eastern sort, see Persicaria.

Ash-keys, see Fraxinus.

Asphodel, or King-spear, see Asphodelus.

Auricula.

Beech-mast, see Fagus.

Bishop's-weed, see Ammi.

Christopher-herb, see Actæa.

Ciceli, see Myrrhis.

Colchicum, or Bastard-saffron.

Corn-fallad, see Valeriana.

Cornflag, see Gladiolus.

Crocus.

Crown Imperial, see Fritillaria.

Fennel-giant, see Ferula.

Flower-de-luce, see Iris.

Fraxinella, see Dictamnus.

Fritillaria, or chequered Tulip.

Gentian, see Gentiana.

Ground Pine, see Teucrium.

Hare's-ear, see Bupleurum.

Hartwort, see Bupleurum and Seseli.

Hog's-fennel, see Peucedanum.

Hornbeam, see Carpinus.

Hyacinth, see Hyacinthus.

Juniper, see Juniperus.

Laferwort, see Lasepitem.

Lilly, see Lilium.

Lilly-asphodel, see Crinum and Hemerocallis.

Lilly-hyacinth, see Scilla.

Lilly-narcissus, see Amaryllis.

Lovage, see Ligusticum.

Mandrake, see Mandragora.

Maple, see Acer.

Masterwort, see Imperatoria and Astrantia.

Mercury, see Mercurialis.

Moly, see Allium.

Muscari.

Narcissus

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Narcissus, or Daffodil.
Oak, see Quercus.
Oak of Jerusalem, see Chenopodium.
Pasque-flower, see Pulsatilla.
Piony, see Pæonia.
Polyanthus, see Primula.
Ranunculus, or Crowfoot.
Samphire, see Crithmum.
Scurvy-grass, see Cochlearia.
Seseli, or Sermountain, see Siler.
Snow-drop, see Galanthus.
Sowbread, see Cyclamen.
Spiderwort, see Anthericum.
Spignel, see Meum.
Star of Bethlehem, see Ornithogalum.
Stavesacre, see Delphinium.
Tulip, see Tulipa.
Turnsole, see Heliotropium.
Yew-tree, see Taxus.

In the next class I shall enumerate those sorts of seeds, which are best the first spring after they are sowed, many of which will not grow if they are kept longer; wherefore those who deal in seeds, should destroy the seeds they have remaining after the season is over, and not sell them to impose on their dealers, to the great loss of their crops, nor keep them to mix with new seeds, as is too often practised.

African Marygold, see Tagetes.
Agrimony, see Agrimonia.
Alkanet, see Buglossum.
Amaranthoides, or Globe Amaranthus, see Gomphrena.
Anise, see Pimpinella.
Asparagus, or Spearage.
Balsamine, see Impatiens.
Basil, see Ocimum.
Bastard Saffron, see Carthamus.
Bay-tree, see Laurus.
Bean, see Faba.
Beet, see Beta.
Blue-bottle, see Cyanus.
Borage, see Borago.
Buckwheat, see Fagopyrum.
Bugloss, see Buglossum.
Canterbury-bell, see Campanula.
Caraway, see Carum.
Carnation, see Dianthus.
Carrot, see Daucus.
Caterpillar, see Scorpiurus.
Celery, see Apium.
Chervil, see Chærophylloides.
Chestnut, see Castanea.
Chickling Pea, see Cicer.
Clary, see Horminum and Sclarea.
Columbine, see Aquilegia.
Coriander, see Coriandrum.
Crane's-bill, see Geranium.
Cress, see Nasturtium.
Cumin, see Cuminum.
Cypress, see Cupressus.
Dame's Violet, see Hesperis.
Everlasting Pea, see Lathyrus.
Fennel, see Foeniculum.
Fennel-flower, see Nigella.
Fenugreek, see Trigonella.
Finochia, see Foeniculum.
Fir, see Abies.
French Honeysuckle, see Hedysarum.
French Marygold, see Tagetes.
Goat's-rue, see Galega.
Globe Thistle, see Echinops.
Gromwel, or Graymil, see Lithospermum.
Henbane, see Hyoscyamus.
Hemp, see Cannabis.
Hollyhock, see Alcea.
Hyssop, see Hyssopus.
Indian Pepper, see Capsicum.
Kidney-bean, see Phaseolus.

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Larch-tree, see Larix.
Larkspur, see Delphinium.
Lavender, see Lavendula.
Laurel, see Padus.
Leek, see Porrum.
Lentil, see Lens.
Love-apple, see Lycopersicon.
Lupine, see Lupinus.
Lychnis, or Catchfly.
Mad-apple, see Melongena.
Mallow, the Venetian, see Hibiscus.
Marjoram, see Majorana.
Marvel of Peru, see Mirabilis.
Marygold, see Calendula.
Millet, see Milium.
Mullein, see Verbascum.
Moth-mullein, see Blattaria.
Navew, see Napus.
Oil-nut, or Palma Christi, see Ricinus.
Roman Nettle, see Urtica.
Onion, see Cepa.
Orach.
Origanum, see Origanum.
Panic, see Panicum.
Parsley, see Apium.
Parsnep, see Pastinaca.
Peas, see Pisum.
Pink, see Dianthus.
Poppy, see Papaver.
Purslain, see Portulaca.
Radish, see Raphanus. This will grow well two years.
Rape, see Napus.
Rue, see Ruta.
Savory, see Satureja.
Scabious, see Scabiosa.
Skirret, see Sifarum.
Snails, see Medica.
Snapdragon, see Antirrhinum.
Spinach, see Spinachia.
Stock-gilliflower, see Leucoium.
Succory, see Cichorium.
Sun-flower, see Helianthus.
Thyme, see Thymus.
Tobacco, see Nicotiana.
Trefoil, see Trifolium.
Turnep, see Rapa.
Venus Looking-glass, see Campanula.
Venus Navelwort, see Omphalodes.
Vetch, see Vicia.
Woad, see Isatis.
Wall-flower, see Leucoium.

The next class of seeds are such as may be kept two years and will not be the worse, provided they are well sowed, though these are equally good for use the first year.

Amaranthus, or Flower-gentle.
Cabbage, } see Brassica.
Cauliflowers, }
Citrus, or Water Melon, see Anguria.
Clover, see Trifolium.
Convolvulus, or Bindweed.
Endive, see Endivia.
Flax, see Linum.
Indian Flowering-reed, see Cannacorus.
La-lucern, see Medica.
Lavender, see Lavendula.
Lettuce, see Lactuca.
Mellilot, see Trifolium.
Mustard, see Sinapi.
Sorrel, see Acetosa.

The fourth class of Seeds are such as may be kept three years or more, and will grow very well afterward, provided they are well sowed; and some of the sorts are generally preferred for being three years old, particularly the Cucumber and Melon-seeds; because, when the Seeds are new, the plants grow too vigorous, and produce a small quantity of fruit;

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but it is not proper to keep these longer than four or five years, notwithstanding they will grow at eight or nine years old; because when the seeds are too old, the plants will be weak, and the fruit which they produce will be small.

Amaranthus, or Flower-gentle.
Cabbage, see Brassica.
Cedar of Libanus, see Larix, if kept in the cones.
Cucumber, see Cucumis.
Gourd, see Cucurbita.
Lettuce, see Lactuca.
Melon, see Melo.
Pinus, the Pine-tree, if kept in the cones.
Pumpion, see Pepo.
Savoy, see Brassica.
Sinnel, or Squash, see Cucurbita.
Water Melon, see Anguria.

The following is a list of such Seeds as will frequently remain in the earth a whole year, especially if they are sown in the spring; so that whenever the plants do not come up the first year, the ground should remain undisturbed till the following spring (but must be kept clear from weeds) when the plants will come up.

Adonis, or Flos Adonis.
Alaternus.
Alexanders, see Smyrnum.
Angelica.
Corn-sallad, see Valerianella.
Fennel, see Foeniculum.
Fraxinella, or White Dittany, see Dictamnus.
Golden-rod, see Solidago.
Gromwel, or Gramil, see Lithospermum.
Hare's-ear, } see Bupleurum.
Hartwort, }
Hawthorn, see Mespilus.
Hog's-fennel, see Peucedanum.
Holly, see Ilex.
Juniper, see Juniperus.
Laserwort, see Laferpitium.
Lovage, see Ligusticum.
Maple, see Acer.
Masterwort, see Asfrantia.
Mercury, see Mercurialis.
Moly.
Piony, see Pæonia.
Seseli, or Sermountain, see Siler.
Spignel, see Meum.
Starwort, see Aster.
Stavesacre, see Delphinium.
Turnsole, see Heliotropium.
Yew, see Taxus.

If the seeds mentioned in this list are sown soon after they are ripe, many of the sorts will come up the following spring; but whenever they fail so to do, there will be no danger of their growing the following year, provided the Seeds were good, therefore people should not despair of them the first year. Most of the umbelliferous plants have this property of remaining in the ground several months, and sometimes a whole year, before the plants appear; therefore they should be managed accordingly, by sowing their seeds on a border, which can be suffered to remain undisturbed till the plants come up. There are some particular sorts of seeds, which I have known remain in the ground eighteen months, and sometimes two years, after which time the plants have come up very well: of these sorts are the Morina, Tribulus terrestris, Stavesacre, Mercury, and some others; but as they do not constantly remain so long in the ground, there can be no certainty of the time when the plants will appear.

The rules here laid down, concerning the length of time which seeds may be kept out of the ground and prove good, will in general be found true; being drawn up from several years experience, having taken

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notes every year from the times of sowing great varieties of seeds, to the appearance of the plants above ground. And in this I have observed such oddness in the growth of seeds, as is not to be accounted for; as that of sowing seeds of the same plant for two or three years successively, and not having had one plant arise; and the fourth year, from the remaining part of the seeds, I have had some plants come up, notwithstanding the age of the Seeds. At other times it has happened, that some Seeds have grown the same spring they were sown, and a great part of them have remained in the ground till the following autumn, when the plants have come up, so that there have been two different crops from the same sowing. I have also tried many experiments in keeping of Seeds, and find the best method to preserve them good is, to keep them in a moderate temperature of warmth, where they may not suffer from any inclemencies in the outward air, nor have too much warmth, which will exhale the moisture too freely, and cause the Seeds to decay sooner than they otherwise would do. This is well known to most people who cultivate Melons, who, when their Seeds are new, which would occasion the plants being too vigorous, and therefore not so fruitful, put them into the inner pocket of their breeches, which are in constant wear, where they keep them for six weeks or two months before they sow them, which will weaken the seeds as much as two years longer keeping them in the ordinary way.

All sorts of Seeds will keep much longer in their pods, or outer coverings, where they can be thus preserved; because the covering not only preserves them from the injuries of the outward air, but if the Seeds are not separated from them, they supply them with nourishment, and thereby keep them plump and fair. But the Seeds of all soft fruits, such as Cucumbers, Melons, &c. must be cleansed from the fruit and mucilage which surrounds them, otherwise the rotting of these parts will corrupt and decay the Seeds in a short time.

When Seeds are gathered, it should always be done in dry weather, when there is no moisture upon them; and then they should be hung up in bags (especially those which vermin eat) in a dry room; in which situation they will keep longer than if they were closely shut up, and the air excluded from them.

There are but few people who are curious enough in saving their Seeds; some, for want of judgment, not distinguishing the best plants of their kinds, to let them grow for seeds; and others, out of covetousness to save a great quantity of seeds, frequently let a whole spot of ground, filled with any particular sort of plants run up to seed, so that the good and bad plants are saved indifferently, which is the occasion of the general complaint of the badness of the Seeds which are commonly vended, and is what the dealers in Seeds should endeavour to remedy.

There is a common method of trying the goodness of many sorts of Seeds, which is, by putting them in water, and those of them which sink to the bottom are esteemed good, but what swim on the surface are rejected as good for little; but this will not hold in many sorts, for I have saved the Seeds of Melons, which have floated on the surface of the water when they were washed from the pulp, and after keeping them two years, they have grown well; but the Melons produced on these plants were not so thick fleshed, as those which were produced from heavy Seeds of the same Melon. The lightness of many sorts of Seeds, I apprehend, may be owing to their not having been sufficiently impregnated by the farina fecundans; which is frequently the case with those plants that are kept in stoves, or under frames, where the external air is often too much excluded from them, which may be absolutely necessary to the conveying of the farina in substance, or the gentle effluvia thereof, to the uterine cells; and this more particularly may be the case, in those sorts which are male and female in different plants; or where the male flowers grow

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at remote distances from the female, on the same plant; which in the Melons, Cucumbers, Gourds, and many other sorts of plants, is constant. Therefore of late years, since the doctrine of the generation of plants has been better known amongst gardeners, they have been curious enough to assist nature in this operation; but they have had more regard to the production of fruit, than to the obtaining of perfect Seeds; though by procuring of the one, the other must of course receive the benefit. This practice has been principally confined to the setting of the fruit of their Melons, and early Cucumbers. The method is this; when the fruit appears upon the plants, and the flower at the top is just fully expanded, they take some of the most vigorous male flowers, and with a pin move the apice which sustain the farina fecundans, gently up and down, over the blossom of the female flowers, whereby the farina is scattered into them; and also lay one of the fresh blown male flowers with the open side over the mouth of the female flowers, that hereby the fruit may be sufficiently impregnated; and where there are male flowers so situated, as that they may be joined without pulling them off the plant, it is always to be chosen. By this method, the gardeners have succeeded in setting the first fruits of this sort which have appeared on the plants, which before this was practised, generally dropped off, and never grew to any size; so that very often, when the weather has proved so unfavourable as to render it unsafe to admit the external air to the plants, the fruit have been produced successively for three weeks or a month, before any of them have been set to grow, but have fallen off soon after they appeared. Therefore this is a convincing proof of the necessity for the ovary of the fruit to be impregnated, especially where good Seeds are to be obtained; and this will explain the cause of new Seeds often failing, as hath been already mentioned under the article of GENERATION; so that many persons have been deceived by sowing Seeds of their own saving, without knowing how it has happened. I have several times been deceived in obtaining good Seeds of tender exotic plants, which have flowered, and produced (to all appearance) very good Seeds, but many times they have all failed; which I apprehend was owing to the keeping of the glasses so close, during the time the plants were in flower, as that the external air was excluded; which, if it had been admitted, might have assisted the farina in the impregnation of the Seed, and thereby have rendered it good; because from the same plants, in more favourable seasons, when the free air has been admitted, have produced plenty of good Seeds.

In the tables here subjoined, I have given the common English names of the Seed, opposite to which I have added the Latin names, that the reader may with ease turn to the several articles in the Gardeners Dictionary, where each sort is particularly treated of, and directions are given for their management.

SEGMENTS OF LEAVES are the parts of such leaves of plants as are divided or cut into many shreds.

SELAGO. Lin. Gen. Plant. 687. Camphorata. Com. Santolina. Boerh.

The CHARACTERS are,

The flower has a small permanent empalement of one leaf, cut into four parts at the top. The flower is of one petal, it has a very small tube, a little perforated; the brim is spreading, and cut into five parts, the two upper segments are the least. It hath four hair-like stamina the length of the petal, to which they are inserted, two of which are longer than the other, terminated by single summits; and a roundish germen supporting a single style, crowned by an acute stigma. The germen afterward becomes a single seed, wrapped up in the petal of the flower. This genus of plants is ranged in the second section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two shorter stamina, and the seeds are included in a capsule.

We have but one SPECIES of this genus at present, in the English gardens, viz.

SELAGO (*Corymbosa*) corymbo multiplici. Lin. Sp. Plant. 629. *Selago with a multiplied corymbus.* Camphorata Africana, umbellata, frutescens. Hort. Amst. 2. p. 79. *Shrubby, African, umbellated Camphorata.*

This plant grows naturally at the Cape of Good Hope; it has slender ligneous stalks which rise seven or eight feet high, but are so weak as to require support; they send out many slender branches, which are garnished with short, linear, hairy leaves, that come out in clusters from the same point. The flowers are produced in umbels at the top of the stalks, the general umbel being composed of a multiplicity of small umbels; they are very small, and of a pure white; they appear in July and August, but are not succeeded by seeds here.

This plant is preserved in gardens more for the sake of variety than for its beauty, for the branches grow very irregular, and hang downward, and the leaves being small make little appearance, and the flowers are so small as not to be distinguished at any distance.

It is propagated by cuttings, which puts out roots freely if they are planted in any of the summer months; if these are planted in a bed of fresh earth, and covered close down with a bell or hand-glass, shading them from the sun, and refreshing them now and then with water, they will soon put out roots; then they must be gradually hardened, and afterward transplanted into small pots, placing them in the shade till they have taken root; then they may be placed with other hardy green-house plants, where they may remain till the end of October, when they must be removed into shelter, for these plants will not live in the open air in England; but as they only require protection from hard frost, so they should be treated in the same way as other of the hardiest kinds of green-house plants.

SELINUM. Lin. Gen. Plant. 300. Thysselinum. Tourn. Inst. R. H. 319. Milky Parsley.

The CHARACTERS are,

It has an umbellated flower; the general umbel is plain and spreading, and the particular umbels are the same; the involucre is composed of many linear spear-shaped leaves which spread open; the umbel is uniform; the flowers have five inflexed heart-shaped petals which are unequal; they have five hair-like stamina terminated by roundish summits. The germen is situated under the flower, supporting two reflexed styles, crowned by single stigmas; it afterward becomes a plain compressed fruit channelled on both sides, parting in two, containing two oblong elliptical plain seeds, channelled in the middle, and have membranes on their sides.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. SELINUM (*Sylvestre*) radice fusi-formi multiplici. Hort. Cliff. 93. *Milky Parsley with spindle-shaped roots.* Thysselinum Plinii. Lob. Icon. 711. *Pliny's wild Milky Parsley.*

2. SELINUM (*Palustre*) sublaetescens radice unica. Haller. Helv. 443. *Selinum which is almost milky, and having a single root.* Thysselinum palustre. Tourn. Inst. 319. *Marsh, wild, Milky Parsley.*

The first sort grows by the sides of lakes and standing waters in several parts of Germany; this hath many spindle-shaped roots, hanging by fibres which spread and multiply in the ground. The stalks rise five or six feet high; they are streaked, and of a purple colour at bottom, sending out several branches toward the top; the leaves are finely divided like those of the Carrot, and when broken there issues out a milky juice; the stalks are terminated by umbels of whitish flowers which come out in June, and are succeeded by compressed bordered seeds which ripen in August.

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The second sort grows naturally in marshy places in Germany. The leaves of this are much longer and cut into narrower segments than those of the former; the stalks rise higher; the umbels are larger, as are also the seeds. The whole plant abounds with a caustic milky juice.

These plants are preserved in botanic gardens for variety, but are rarely cultivated any where else; they are easily propagated by seeds, which should be sown in autumn, and the plants afterward treated in the same way as Angelica.

SEMIFISTULAR FLOWERS are such whose upper part resembles a pipe cut off obliquely, as in Aristolochia or Birthwort.

SEMINAL LEAVES are those plain, soft, and undivided leaves that first shoot forth from the greatest part of all sown seeds, which leaves are very different from those which succeed on the same plant, in size, figure, surface, and position.

A **SEMINARY** is a seed-plot which is adapted or set apart for the sowing of seeds. These are of different natures and magnitudes, according to the several plants intended to be raised therein. If it be intended to raise forest or fruit-trees, it must be proportionably large to the quantity of trees designed, and the soil should be carefully adapted to the various sorts of trees. Without such a place as this every gentleman is obliged to buy, at every turn, whatever trees he may want to repair the losses he may sustain in his orchard, wilderness, or larger plantations, so that the necessity of such a spot of ground will easily be perceived by every one; but, as I have already given directions for preparing the soil, and sowing the seeds in such a Seminary, under the article of **NURSERY**, I shall not repeat it in this place, but refer the reader to that article.

It is also as necessary for the support of a curious flower-garden, to have a spot of ground set apart for the sowing of all sorts of seeds of choice flowers; in order to obtain new varieties, which is the only method to have a fine collection of valuable flowers, as also for the sowing of all sorts of biennial plants to succeed those which decay in the flower-garden, by which means the borders may be annually replenished, which, without such a Seminary, could not be so well done.

This Seminary should be situated at some distance from the house, and be entirely closed either with a hedge, wall, or pale, and kept under lock and key, that all vermin may be kept out, and that it may not be exposed to all comers and goers, who many times do mischief before they are aware of it. As to the situation, soil, and manner of preparing the ground, it has been already mentioned under the article of **NURSERY**, and the particular account of raising each sort of plant being directed under their proper heads, it would be needless to repeat it here.

SEMINIFEROUS. Bearing or producing seed.

SEMPERVIVUM. Lin. Gen. Plant. 538. Sedi species. Tourn. Inst. R. H. 262. tab. 140.

The **CHARACTERS** are,

The flower has a concave permanent empalement cut into many acute segments; it has ten oblong, spear-shaped, pointed petals a little longer than the empalement, and twelve or more narrow awl-shaped stamina terminated by roundish summits; it has twelve germen placed circularly, sitting upon so many styles which spread out, and are crowned by acute stigmas. The germen afterward become so many short compressed capsules, pointed on the outside, and open on the inside, filled with small seeds.

This genus of plants is ranged in the fifth section of Linnæus's eleventh class, which includes those plants whose flowers have twelve stamina and many styles.

The **SPECIES** are,

1. **SEMPERVIVUM (Tectorum)** foliis ciliatis, propaginibus patentibus. Lin. Sp. Plant. 464. *Houseleek with hairy-edged leaves, and spreading offsets.* Sedum majus vulgare. C. B. P. 283. *Common large Houseleek.*
2. **SEMPERVIVUM (Globiferum)** foliis ciliatis, propaginibus globosis. Lin. Sp. Plant. 464. *Houseleek with*

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hairy-edged leaves, whose offsets are globular. Sedum majus vulgari simile, globulis decidentibus. Mor. Hist. 3. p. 472. *Greater Houseleek resembling the common, and having globular offsets which fall off.*

3. **SEMPERVIVUM (Montanum)** foliis ciliatis, propaginibus patulis. Lin. Sp. Plant. 665. *Houseleek with hairy edges and spreading offsets.* Sedum montanum majus foliis non dentatis, floribus rubentibus. C. B. P. 283. *Greater Mountain Houseleek whose leaves are not indented, and having red flowers.*

4. **SEMPERVIVUM (Arachnoideum)** foliis pilis intertextis, propaginibus globosis. Lin. Sp. Plant. 465. *Houseleek with threads from leaf to leaf, and globular offsets.* Sedum montanum tomentosum. C. B. P. 284. *Woolly Mountain Houseleek, commonly called Cobweb Sedum.*

5. **SEMPERVIVUM (Arboreum)** caule arborecente lævi ramoso. Lin. Sp. Plant. 464. *Houseleek with a smooth, tree-like, branching stalk.* Sedum majus arborecens. J. B. 3. 686. *Greater Tree Houseleek.*

6. **SEMPERVIVUM (Canariense)** caule foliorum rudibus lacero, foliis retusis. Lin. Sp. Plant. 464. *Houseleek with stalks torn by the rudiments of the leaves, and blunt-pointed leaves.* Sedum Canarium, foliis omnium maximis. Hort. Amst. 2. p. 189. *Canary Houseleek with the largest leaves.*

7. **SEMPERVIVUM (Africanum)** foliorum marginibus serrato-dentatis, propaginibus patulis. *Houseleek with leaves whose borders are indented like a saw, and spreading offsets.* Sedum Afrum montanum, foliis subrotundis, dentibus albis ferratis confertim natis. Boerh. Ind. alt. 1. p. 286. *African Mountain Houseleek, with roundish, indented, sawed leaves, having white edges.*

The first sort is our common Houseleek, which is seen in every part of England growing on the tops of houses and walls, but is not a native of this country; it has many thick succulent leaves set together in a round form; they are convex on their outside and plain within, sharp-pointed, and their borders are set with short fine hairs. The leaves spread open, and lie close to the earth in which they grow, sending out on every side offsets of the same form. From the center of these heads arises the flower-stalk which is about a foot high, succulent and round, of a reddish colour, and is garnished at bottom with a few narrow leaves; the upper part of the stalk divides into two or three parts, each sustaining a spike or range of flowers which are reflexed. The flowers are composed of several petals which spread open, and end in acute points; they are red, and in the center is situated the crown or germen which are placed circularly, and, after the petals are fallen off, they swell and become so many horned capsules filled with small seeds. It flowers in July, and the seeds ripen in autumn.

This plant is easily propagated by offsets, which the plants put out in plenty on every side. If these are planted in mud or strong earth placed on a building or old wall, they will thrive without farther care.

The second sort grows naturally in the northern parts of Europe. The leaves of this sort are much narrower, and the heads are furnished with a greater number of leaves than those of the former, which grow more compact, and are closely set on their edges with hairs. The offsets of this are globular, their leaves turning inward at the top, and lie close over each other; these are thrown off from between the larger heads, and falling on the ground take root, whereby it propagates very fast. The flower-stalks of this are smaller, and do not rise so high as those of the former, and the flowers are of a paler colour.

The third sort grows naturally upon the Helvetian mountains; this greatly resembles the first, but the leaves are smaller and have no indentures on their edges; the offsets of this sort spread out from the side of the older heads, and their leaves are more open and expanded. Out of the center of the crown comes forth the flower-stalk, which rises nine or ten inches high, garnished below with some narrow leaves; the upper part is divided into three or four branches, which are closely furnished with deep red flowers, composed

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posed of twelve star-pointed pointals, set round the circle or germen, which is attended by twenty-four stamina terminated by purple summits. This flowers at the same time with the first sort.

The fourth sort grows naturally upon the Alps and Helvetian mountains; this has much shorter and narrower leaves than either of the former. The heads are small and very compact; the leaves are gray, sharp-pointed, and have slender white threads crossing from one to the other, intersecting each other in various manners, so as in some measure to represent a spider's web. The flower-stalks rise about six inches high, they are succulent, round, and garnished with awl-shaped succulent leaves placed alternately; the upper part of the stalk divides into two or three branches, upon each of which is a single row of flowers ranged on one side above each other, composed of eight spear-shaped petals, of a bright red colour, with a deep red line running longitudinally in the middle; these spread open in form of a star, and in the center is situated the crown or germen of an herbaceous colour, surrounded by sixteen purple stamina which are erect and spreading, terminated by yellow summits. This sort flowers in June and July.

All the above-mentioned sorts are extremely hardy, and propagate very fast by offsets; they love a dry soil, so are very proper to plant in rock-work, where they will thrive better than in the full ground, and they want no care; for when they are once fixed, they will propagate and spread fast enough, so that the larger sorts may require to be annually reduced to keep them within proper compass. When any of these heads flower, they die soon after, but the offsets soon supply their place.

The fifth sort grows naturally at the Cape of Good Hope, and also in Portugal; the old walls about Lisbon are covered with this plant. This rises with a fleshy smooth stalk eight or ten feet high, dividing into many branches, which are terminated by round heads or clusters of leaves lying over each other like the petals of a double Rose; they are succulent and spear-shaped, of a bright green, and have very small indentures on their edges like the teeth of a very fine saw. The stalks are marked with the vestiges of the fallen leaves, and have a light brown bark; the flowers rise from the center of the heads, forming a large pyramidal spike; they are of a bright yellow colour, and the petals spread open like the points of a star; the other parts are like those of the other species. This sort generally flowers in autumn or winter, and the flowers continue long in beauty, during which time they make a fine appearance.

There is a variety of this with variegated leaves, which is much esteemed by the curious; this was obtained by a branch which had been accidentally broken from a plant of the plain kind at Badmington, the seat of his Grace the Duke of Beaufort, which, after having laid some time, was planted, and when the young leaves pushed out, they were variegated. These plants are easily propagated by cutting off the branches, which, when planted, soon put out roots; these should be laid in a dry place for a week before they are planted, that the bottom may be healed over, otherwise they are apt to rot, especially if they have much wet. When the cuttings are planted in pots, they should be placed in a shady situation, and must have but little wet, and if they are planted in a shady border, they will require no water, for the moisture of the ground will be sufficient for them. Some years past these plants were tenderly treated; their cuttings were put into a hot-bed to forward their putting out roots, and in winter the plants were kept in stoves, but later experience has taught us that they will thrive better with hardier treatment; for, if they are protected from frost and wet in winter, and have a good share of air in mild weather, they will thrive better, and flower oftener than when they are tenderly nursed. I have frequently seen the branches of these plants, which have been accidentally broken off and fallen on the

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ground, put out roots as they have laid, and have made good plants. The sort with striped leaves is tenderer than the other, and more impatient of wet in winter.

The sixth sort grows naturally in the Canary Islands; this seldom rises high, unless the plants are drawn up by tender management. The stalk is thick and rugged, chiefly occasioned by the vestiges of the decayed leaves; it seldom rises above a foot and a half high, supporting at the top one very large crown of leaves, disposed circularly like a full-blown double Rose. The leaves are large, and end in obtuse points which are a little incurved; they are succulent, soft to the touch, and pliable. The flower-stalk comes out of the center, and rises near two feet high, branching out from the bottom, so as to form a regular pyramid of flowers, which are of an herbaceous colour, and shaped like those of the other species; they appear in June and July, and are succeeded by horned capsules filled with small seeds which ripen late in autumn or winter, and then the plant dies.

This is propagated by seeds, which should be sown soon after it is ripe in pots filled with light sandy earth, covering them over very lightly with the same earth. These pots should be placed under a common frame to keep out the frost, but should be exposed to the open air at all times in mild weather; here the pots may remain till the spring, when the danger of hard frosts is over, and then they should be removed to a situation where they may have only the morning sun, and in dry weather the earth should be watered gently. This will soon bring up the plants, which must be kept clean from weeds, and, when they are fit to remove, they should be planted in pots filled with light loamy earth, and placed in the shade till they have taken new root; then they may be placed with other hardy succulent plants in a sheltered situation for the summer, and if in winter they are placed in a frame where they may be protected from hard frost, and enjoy the free air in mild weather, they will thrive better than with tender treatment.

The seventh sort grows naturally at the Cape of Good Hope; this is a very low plant, whose heads spread close on the ground; they are much smaller than those of the common Houseleek. The leaves have white edges, which are indented like the teeth of a saw; they spread open flat; the flowers are produced in loose panicles upon naked foot-stalks; they are small and white, so make but little appearance.

This is propagated by offsets, which are put out in plenty from the sides of the heads; this must be planted in pots, sheltered from the frost in winter, and in summer placed in the open air with other hardy succulent plants.

SENECIO. Tourn. Inst. R. H. 456. tab. 260. Lin. Gen. Plant. 857. [so called from senescere, *Lat.* to wax old, because in a hot climate or weather it soon flourishes, and grows old, and the seed afterward represents the head of old men. It is also called Erigeron from ἔρι, in the spring, and γερῶν, to wax old, because it flourishes in winter, and become old in the spring. It is also called Herba Pappa, because its seeds are very downy.] Groundsel; in French, Senecion.

The CHARACTERS are,

The flower is composed of many hermaphrodite florets which form the disk, and female half florets which make the border or rays; these are included in one common cylindrical empalement which is rough, scaly, and contracted above. The hermaphrodite florets are tubulous, funnel-shaped, and cut into five parts at the brim, which are reflexed; they have five small hair-like stamina connected at the top, terminated by cylindrical summits, and an oval germen covered with down, situated under the petal, supporting a slender style, crowned by two oblong revolving stigmas. The germen afterward turns to an oval seed, covered with down, inclosed in the empalement. The female half florets, which form the rays are stretched out like a tongue, and are indented in three parts at the top.

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This genus of plants is ranged in the second section of Linnæus's nineteenth class, which contains those plants whose flowers are composed of hermaphrodite fruitful florets, and female half florets which are barren. To this genus he has added several of Tournefort's species of Ragwort.

We shall not trouble the reader with the mentioning those species of this genus which are esteemed common weeds, so are not cultivated in gardens, but confine ourselves to those which are the most valuable here.

The SPECIES are,

1. *SENECIO (Hieracifolius)* corollis nudis, foliis amplexicaulibus laceris, caule herbaceo erecto. Hort. Upsal. 261. *Groundsel with naked petals, torn leaves embracing the stalk, and an erect herbaceous stalk.* *Senecio Americanus altissimus, maximo folio.* Tourn. Inst. 456. *Tallest American Groundsel with a very large leaf.*
2. *SENECIO (Pseudo China)* corollis nudis, scapo subnudo longissimo. Flor. Leyd. Prod. 164. *Groundsel with naked stalks which are very long.* *Senecio Madraspatanus, rapi folio, floribus maximis cujus radix à nonnullis China dicitur.* Hort. Elth. 345. *Groundsel of Madras, with a Turnep leaf and a very large flower, whose root is called China-root.*
3. *SENECIO (Aureus)* corollis radiantibus, foliis crenatis, infimis cordatis petiolatis, superioribus pinnatifidis lyratis. Flor. Virg. 98. *Groundsel with radiated flowers and crenated leaves, the lower ones of which are heart-shaped and have foot-stalks, but the upper lyre-shaped and wing-pointed.*
4. *SENECIO (Hastulatus)* corollis radiantibus, petiolis amplexicaulibus, pedunculis folio triplo longioribus, foliis pinnato-sinuatis. Flor. Leyd. Prod. 164. *Groundsel with radiated flowers, foot-stalks embracing the stalks, foot-stalks to the flowers three times the length of the leaves, and winged sinuated leaves.* *Jacobæa Afra, perennis viscosa lutea, asplenii folio.* Vaill. Act. 1720. *African, perennial, yellow, clammy Ragwort, with a Spleenwort leaf.*
5. *SENECIO (Elegans)* corollis radiantibus, foliis pinnatifidis æqualibus patentissimis, rachi infernè angustatâ. Hort. Cliff. 406. *Groundsel with radiated flowers, wing-pointed leaves which are equal and spreading, and the midrib below narrowed.* *Jacobæa Africana frutescens, flore amplo purpureo elegantissimo, senecionis folio.* Volk. Norimb. 225. *Shrubby African Ragwort, with a large, elegant, purple flower, and a Groundsel leaf.*
6. *SENECIO (Abrotanifolius)* corollis radiantibus, foliis pinnato-multifidis linearibus, nudis acutis floribus corymbosis. Lin. Sp. Plant. 869. *Groundsel with radiated flowers, and wing-pointed, multifid, linear leaves.* *Jacobæa foliis ferulaceis, flore minore.* Tourn. Inst. R. H. 486. *Ragwort with leaves like Giant Fennel, and a smaller flower.*
7. *SENECIO (Paludosus)* corollis radiantibus, foliis ensiformibus acutè ferratis subtus subvillosis, caule stricto. Lin. Sp. Plant. 870. *Groundsel with radiated flowers, sword-shaped leaves which are acutely sawed, a little hairy on their under side, and a close stalk.* *Jacobæa palustris altissima, foliis ferratis.* Tourn. Inst. 485. *Tallest Marsh Ragwort with sawed leaves.*
8. *SENECIO (Sarracenicus)* corollis radiantibus, floribus corymbosis, foliis lanceolatis ferratis glabriusculis. Hort. Upsal. 266. *Groundsel with radiated flowers growing in a corymbus, and spear-shaped, sawed, smooth leaves.* *Jacobæa Alpina, foliis longioribus ferratis.* Tourn. Inst. R. H. 485. *Alpine Ragwort with longer sawed leaves.*
9. *SENECIO (Altissimus)* corollis radiantibus, floribus corymbosis, foliis lanceolatis ferratis semiamplexicaulibus. *Groundsel with radiated flowers growing in a corymbus, and spear-shaped sawed leaves half embracing the stalks.* *Jacobæa pratensis altissima, limonii folio.* Tourn. Inst. 485. *Tallest Meadow Ragwort, with a Sea Lavender leaf.*
10. *SENECIO (Orientalis)* corollis radiantibus, floribus corymbosis, foliis ensiformibus dentatis amplexicaulibus. *Groundsel with radiated flowers growing in a corymbus, and sword-shaped indented leaves which embrace*

the stalks. *Jacobæa Orientalis, latifolia altissima.* Tourn. Cor. 36. *Tallest Eastern Ragwort with a broad leaf.*

11. *SENECIO (Incanus)* corollis radiantibus, foliis utrinque tomentosis subpinnatis laciniis subdentatis, corymbo subrotundo. Haller. Helv. 731. *Groundsel with radiated flowers, half-winged leaves which are downy on both sides, segments which are somewhat indented, and a roundish corymbus of flowers.* *Chrysanthemum Alpinum incanum, foliis laciniatis.* C. B. P. 133. *Alpine, hoary, Corn Marygold with cut leaves.*
12. *SENECIO (Rigidus)* corollis radiantibus, spatulaceis repandis amplexicaulibus scabris erosis, caule fruticoso. Hort. Cliff. 406. *Groundsel with radiated flowers, spatula-shaped, rough-pointed, sawed leaves, embracing the stalks, which are shrubby.* *Jacobæa Africana frutescens, foliis rigidis & hirsutis.* Hort. Amst. 2. p. 149. *Shrubby African Ragwort, with stiff and hairy leaves.*
13. *SENECIO (Ilicifolius)* corollis radiantibus, foliis sagittatis amplexicaulibus dentatis, caule fruticoso. Vir. Cliff. 84. *Groundsel with radiated flowers, and arrow-pointed indented leaves embracing the stalks, which are shrubby.* *Jacobæa Africana frutescens, foliis incisifs & subtus cinereis.* Com. Rar. Plant. 42. *African shrubby Ragwort, with cut leaves, which are gray on their under side.*
14. *SENECIO (Halamifolius)* corollis radiantibus, foliis obovatis carnosissimis subdentatis, caule fruticoso. Lin. Sp. Plant. 871. *Groundsel with radiated flowers, oval fleshy leaves which are somewhat indented, and a shrubby stalk.* *Doria Africana arborescens foliis crassiss & succulentis atriplicem referentibus.* Boerh. Ind. alt. 1. 98. *African tree-like Doria, with thick and succulent leaves like Atriplex.*

The first sort grows naturally in North America; this is an annual plant. The stalk is round, channelled, and hairy; it rises three feet high, and is garnished with torn leaves which embrace the stalks with their base; the flowers are produced in a sort of umbel on the top of the stalks, and are composed of florets having no rays; they are of a dirty white, and are succeeded by oblong seeds crowned with a long down. This plant is preserved in some botanic gardens for the sake of variety, but has very little beauty. The seeds of this must be sown upon a hot-bed in the spring, and when the plants are come up fit to remove, they should be transplanted to another hot-bed to bring them forward, and afterward they may be planted in a warm border, where they will flower in July, and their seeds will ripen in autumn.

The second sort grows naturally at Madras; this hath a perennial root, which has been supposed to be the China-root, but is now generally believed to be a spurious kind. The roots are composed of some thick fleshy tubers, sending out many fibres on every side, from which come out some large cut leaves shaped like those of the Turnep, but are smooth. The flower-stalk is slender, almost naked, and rises a foot and a half high, sustaining at the top a few yellow flowers, composed of several hermaphrodite florets, having no rays or borders; these are succeeded by oval seeds crowned with down, but they rarely ripen in England.

This sort is tender, so will not thrive in this country, unless it is kept in a warm stove; it is propagated by parting of the roots in the spring. The offsets should be planted in pots filled with light kitchen-garden earth, and should then be plunged into the tan-bed in the stove, and treated in the same way as other tender exotics.

The third sort grows naturally in North America; this hath a perennial root, from which come out many roundish leaves upon long, slender, hairy foot-stalks; they are about an inch and a half over each way; they are of a purplish colour on their under side, and are crenated on their edges. The stalks rise near two feet high, and are garnished with a few leaves which are indented on each side in form of a lyre. The upper part of the stalk divides into several slender long foot-

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foot-stalks, each sustaining one erect flower composed of several hermaphrodite florets in the center, and a few female florets from the rays or border. They are yellow, and appear in June and July, and the seeds ripen in autumn, which are crowned with down.

It is propagated by offsets, which come out in plenty from the root; these may be separated in autumn, and planted in an east border of loamy earth, allowing each plant two feet room to spread. When they have taken new root, they will require no other care but to keep them clean from weeds.

The fourth sort grows naturally in Africa; this hath an herbaceous perennial stalk, which branches out at the bottom, and rises about two feet and a half high, garnished at bottom with narrow leaves, which are seven or eight inches long, sinuated on the sides so as to resemble winged leaves, and are also indented. The upper leaves are smaller, and embrace the stalks; they are very clammy, and stick to the fingers on being handled; the upper part of the stalk divides into several very long foot-stalks, each sustaining one yellow radiated flower. These plants continue in flower most part of the summer, and the seeds sometimes ripen in autumn.

This is propagated by cutting off the side shoots in any of the summer months, and planting them in a shady border, where in five or six weeks they will take root, and may then be taken up and planted in pots, placing them in the shade till they have new roots; then they may be removed to an open situation, observing to water them duly in dry weather, and in winter they must be placed under a frame, where they may be screened from hard frost, for they will not live abroad through the year here.

The fifth sort grows naturally at the Cape of Good Hope; it is an annual plant, which hath many herbaceous branching stalks that rise near three feet high, garnished with equal wing-pointed leaves which spread flat. The flowers are produced in bunches on the top of the stalks; they are large and radiated, the border or rays being of a beautiful purple colour, and the middle or disk yellow. These plants flower from July till the frost stops them, and make a fine appearance. The seeds ripen in autumn, which, if permitted to scatter, there will be plenty of plants rise the spring following without care; they may be also sown upon a bed of earth in the spring, and when the plants are fit to remove, they may be transplanted about the borders of the flower-garden. If some of the plants are planted in pots and housed in winter, they may be preserved till spring.

The sixth sort grows naturally on the Alps and Pyrenees; this hath a perennial root and an annual stalk. The root is composed of a great number of long slender fibres which strike deep in the ground, and spread on every side; the stalks rise two feet high, and become a little ligneous in autumn; they are garnished their whole length with very narrow wing-pointed leaves, resembling those of Hogs Fennel; the flowers are produced in bunches on the top of the stalks; they are yellow, and have rays or borders resembling those of the other species. This sort flowers in June and July, and the seeds ripen in autumn.

It is propagated by seeds, which should be sown upon a bed of loamy earth, where it is exposed only to the morning sun, where the plants will rise better than in a warmer situation. When the plants are fit to remove, they may be transplanted on a shady border, where they may remain till autumn, observing to keep them clear from weeds all the summer; then they should be transplanted to the places where they are to remain. The following summer the plants will flower and produce ripe seeds, and the roots will continue, if they are in a shady situation and a loamy soil.

The seventh sort grows naturally about Paris, by the sides of waters and in moist meadows. The root is perennial; the stalks rise three or four feet high, are close channelled, and garnished with sword-shaped leaves, five or six inches long and one broad, which

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are sharply sawed on their edges, and are hairy on their under side. The upper part of the stalk divides into several slender foot-stalks, sustaining yellow radiated flowers which appear in June and July, and the seeds ripen in autumn, soon after which the stalks decay to the root.

The eighth sort grows naturally on the Helvetian mountains, and is sometimes found growing in low marshy places in the Isle of Ely; this hath a creeping root, by which it propagates and spreads wide wherever it is once established. The stalks of this rise four feet high, and are garnished with smooth spear-shaped leaves five inches long, and one and a quarter broad; they are sawed on their edges, and placed alternate. The flowers are yellow, radiated, and produced in a sort of corymbus on the top of the stalk; these come out in July, and are succeeded by seeds having down, which ripen in autumn.

The ninth sort grows naturally in France; this hath some resemblance of the eighth, but the root does not creep like that. The leaves are shorter, and the serratures on their edges are very small; they embrace the stalks with their base, and end in sharper points. The flowers are produced in larger and looser bunches on the top of the stalk, are of a paler yellow colour than those of the former, and appear about the same time.

The tenth sort grows naturally in the Levant, where it was discovered by Dr. Tournefort, who sent the seeds to the Royal Garden at Paris; this hath a perennial root and an annual stalk. The lower leaves are a foot long, four inches broad in the middle, and somewhat shaped like a scymitar, the midrib being curved outward toward the point; they are smooth, and slightly indented on their edges. The stalk rises four feet high, and is garnished with leaves growing smaller all the whole length, which embrace it half round with their base; at the top of the stalk the flowers are produced in a compact corymbus; they are of a deep yellow, and have rays like those of the former sorts, which appear about the same time.

These sorts are easily propagated by seeds or parting of their roots; the latter is generally practised when the plant is once obtained, as that is the most expeditious method, especially for the eighth sort, whose roots are apt to spread and increase too fast where they are not confined. The best time to transplant and divide these roots is in autumn; when their stalks decay, that they may get good root before the spring. These plants are too large for small gardens, so are proper furniture for large borders, in extensive gardens, or to plant on the sides of woods, where they may be allowed room, for they should have at least four feet allowed to each. When these are intermixed with other tall growing plants in such places, they will add to the variety.

If they are propagated by seeds, they should be sown on a shady border in the spring, observing, if the season proves dry, to water the ground from time to time, which will bring up the plants; these must be kept clean from weeds, and when they are fit to remove, they should be transplanted into beds at a foot distance, where they may remain till autumn, and then they should be transplanted to the places where they are to stand for flowering.

The eleventh sort grows naturally on the Alps; this is a perennial plant of low growth. The stalks seldom rise a foot high; the whole plant is covered with a very white hoary down; the leaves are winged and indented; the flowers are collected into a close round corymbus on the top of the stalk; they are of a gold colour, and are radiated; these appear in June, but are rarely succeeded by good seeds in England.

It is propagated by slipping off the heads in the spring, and planting them in a bed of loamy earth in a shady situation, where they will put out roots, and may afterward be transplanted into an east border, where they may have the morning sun only, for this plant loves a gentle loamy soil, and a situation not too much exposed to the sun. The plant having fine

hoary leaves, will make a pretty diversity when intermixed with other plants; and, as it requires but little culture, and takes up but little room, they deserve a place in small gardens.

The twelfth sort grows naturally at the Cape of Good Hope; this rises with a shrubby branching stalk six or seven feet high, which is closely garnished with rough leaves, whose base embrace the stalks; those on the lower part are four inches long, and an inch and a half broad, but they gradually diminish in their size to the top; they are stiff, hairy, and of a dark green, oblong, heart-shaped, and indented on their edges. The flowers are produced at the end of the branches; they are radiated, and of a bright yellow colour. This plant continues flowering great part of the summer, and the seeds ripen in autumn.

The thirteenth sort grows naturally at the Cape of Good Hope; this hath a very branching shrubby stalk, which rises four or five feet high, sending out branches irregularly on every side, garnished with stiff leaves, whose base embraces the stalks; they are irregular in their figure, about three inches long, and three quarters of an inch broad, deeply cut on their edges, and of a gray colour on their under side. The flowers grow in loose bunches at the end of the branches, are radiated, and of a pale yellow colour. This sort flowers great part of summer, and the seeds ripen in autumn.

The fourteenth sort grows naturally at the Cape of Good Hope; this has a shrubby stalk which rises seven or eight feet high, sending out branches on every side the whole length, which are garnished with oblong oval leaves indented on their edges; they are about two inches and a half long, and almost two broad, fleshy and hoary. The flowers are produced in loose bunches at the extremity of the branches, almost in form of an umbel; they are radiated, and of a pale yellow colour. This sort flowers in July and August, but rarely produces good seeds here.

The three sorts last mentioned are too tender to live in the open air through the winter in England, but are so hardy as to only require protection from hard frosts; so if they are kept in pots and placed either under a frame in winter, or in a common green-house with other hardy kinds of plants, which require a large share of air in mild weather, and only require to be screened from hard frost, they may be preserved in England. They are all easily propagated by seeds or cuttings, but the latter being the most expeditious method is generally practised here. If the cuttings are planted in a shady border during any of the summer months, they will readily take root, and then they should be taken up with balls of earth to their roots, and each planted in a separate pot filled with good kitchen-garden earth, and placed in the shade till they have taken new root; then they may be removed to a more open situation, where they may remain till there is danger of sharp frost, when they should be removed into shelter, and treated in the same way as other hardy kinds of green-house plants.

If these plants are propagated by seeds, they should be sown on a bed of fresh earth, exposed only to the morning sun the beginning of April, observing in dry weather to moisten the ground now and then, which will forward the vegetation of the seeds. When the plants come up, they must be kept clean from weeds till they are fit to remove, when they should be planted in pots, and treated in the same way as those raised from cuttings.

SENNA. Tourn. Inst. R. H. 618. tab. 390. Cassia. Lin. Gen. 461. [so called from sana, Lat. healthy, because its leaves restore health.] Senna.

The CHARACTERS are,

The flower has an empalement of five concave leaves; it has five roundish concave petals which spread open, and ten declining stamina, terminated by oblong arched summits. The germen is roundish and compressed, supporting a short style, crowned by an obtuse stigma. The germen afterward becomes a plain, roundish, compressed pod, a

little incurved, having two cells divided by an intermediate partition, each containing one or two oblong-pointed seeds.

This genus of plants is ranged in the first section of Linnæus's tenth class, where he has joined it to the genus of Cassia; this section contains those plants whose flowers have ten stamina and one style.

The SPECIES are,

1. SENNA (*Alexandrina*) foliolis quadrijugatis lanceolatis acutis. *Senna with four pair of spear-shaped pointed lobes to the leaves. Senna Alexandrina five foliis acutis. C. B. P. Alexandrian Senna with acute leaves.*

2. SENNA (*Italica*) foliolis quinquejugatis cordatis obtusis. *Senna with five pair of lobes to the leaves, which are heart-shaped and obtuse. Senna Italica five foliis obtusis. C. B. P. 397. Italian Senna with obtuse leaves.*

The first sort grows naturally in Egypt; this is an annual plant, which rises with an upright branching stalk about a foot high, garnished with winged leaves, composed of four pair of small spear-shaped lobes, ending in acute points. The flowers are produced in loose bunches at the top of the stalk; they are yellow, composed of five roundish concave petals, with ten stamina in the center surrounding the style; after the flower is past, the germen turns to a roundish gibbous pod having two cells, each containing one or two oblong seeds. The leaves of this sort are used in medicine, and are commonly known in the shops by the title of Senna; these are annually imported from Alexandria, which occasioned the title of Alexandrina being added to it. This plant is propagated by seeds, which should be sown early in the spring upon a good hot-bed; and when the plants are come up, and are strong enough to transplant, they should be each planted in a small pot filled with light rich earth, and plunged into a fresh hot-bed, shading them from the sun till they have taken new root, after which they must be treated in the same way as the most tender exotics; for as this is an annual plant, unless they are brought forward in the spring, they will not flower in this country; therefore they must be constantly kept in the hot-bed all the summer, observing to admit plenty of air in warm weather; by which method I have frequently had these plants in flower, but it is very rare that they perfect their seeds in England.

If the seeds of this plant were sent to South Carolina, the plants might be propagated there, so as to furnish plenty of the leaves to supply the consumption of Great-Britain.

In the West-Indies, the inhabitants make use of the leaves of several species of Cassia instead of this plant, and also those of the Poinciana, or Flower-fence, which is frequently by them called the true Senna.

The second sort grows naturally in India, from whence I have received the seeds; for although it is called Italian, yet the plant does not grow there naturally. This is also an annual plant, rising with a branching stalk a foot and a half high; the leaves are winged, each having five pair of heart-shaped lobes which are inverted, the point joining the branches, and the obtuse part is upward; they are of a sea-green colour, and of a thick consistence. The flowers are produced at the end of the branches; they are shaped like those of the first sort, but are larger, and of a brighter yellow colour. If the plants are brought forward early in the spring, they will flower in July, and by so doing good seeds may be obtained here. This sort is propagated in the same way as the first, and the plants require the same treatment.

The leaves of this sort have been sometimes used in medicine, but they are not esteemed equal in quality with those of the first.

SENNA THE BLADDER. See COLUTEA.

SENNA THE SCORPION. See EMERUS.

SENSIBLE PLANT. See MIMOSA.

SEPTIFOLIOUS PLANTS, are such as have just seven leaves.

SERAPIAS. Lin. Gen. Plant. 903. Helleborine. Tourn. Inst. R. H. 436. tab. 249. Bastard Hellebore.

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The CHARACTERS are,

It has a single stalk; the sheath of the flower is at a distance. The germen sustains the flower which has no empalement, but has five oblong oval petals which are spreading, but close at the top. The nectarium is the length of the petal, hollowed at the base, oval, and gibbous below, cut into three points, the middle being heart-shaped and obtuse, the others are acute. The flower has two short stamina sitting upon the pointal, terminated by erect summits placed under the upper lip of the nectarium, and an oblong contorted germen situated under the flower, the style growing to the upper lip of the nectarium, crowned by an obsolete stigma. The germen afterward becomes an oval, obtuse, three-cornered capsule, armed with three keels, opening with a valve under each, having one cell filled with small seeds.

This genus of plants is ranged in the first section of Linnæus's twentieth class, which includes those plants whose flowers have but two stamina which are connected to the style.

The SPECIES are,

1. SERAPIAS (*Helleborine*) bulbis fibrosis floribus erectis bractea brevioribus. *Serapias with fibrous bulbs, and erect flowers with short bractea. Helleborine montana latifolia. C. B. P. 186. Broad-leaved, Mountain, Bastard Hellebore.*
2. SERAPIAS (*Damasonium*) bulbis fibrosis, petalis nectario longioribus obtusis, foliis lanceolatis nervosis. *Serapias with fibrous bulbs, obtuse petals which are longer than the nectarium, and veined spear-shaped leaves. Helleborine flore albo vel Damasonium montanum latifolium. C. B. P. 187. Bastard Hellebore with a white flower, or broad-leaved Mountain Damasonium.*
3. SERAPIAS (*Palustre*) bulbis fibrosis. *Serapias with fibrous bulbs, reflexed petals, the lip of the nectarium obtuse, and sword-shaped veined leaves. Helleborine angustifolia palustris, five pratensis. C. B. P. 187. Narrow-leaved Marsh, or Meadow Bastard Hellebore.*
4. SERAPIAS (*Latifolium*) bulbis fibrosis, nectari labio quinquefido clauso, foliis lanceolatis nervosis amplexicaulibus. *Serapias with fibrous bulbs, the lip of the nectarium cut into five parts closed, and spear-shaped veined leaves embracing the stalks. Helleborine latifolia, flore albo clauso. Raii Syn. 2. 242. Broad-leaved Bastard Hellebore, with a white closed flower.*

There are some other species of this genus which grow naturally in Great-Britain and Ireland, but as I have not had the good fortune to meet with them, so I shall not trouble the reader with an imperfect account of them from books: there are also a greater number of them which grow naturally in the West-Indies, of which I have samples in my collection; but having never seen any growing plants of them, I shall not insert them here.

The first sort grows naturally in woods and shady places in many parts of England; the roots are composed of many thick fleshy fibres, from which arise a single stalk a foot high, which is jointed; it is garnished at each joint with one veined leaf, those on the lower part of the stalk are oval, but those above are spear-shaped, ending in acute points; they embrace the stalks at their base. The stalk is adorned with flowers toward the top, which have some resemblance to those of Orchis; they are composed of two whitish, and three herbaceous petals, which expand; and in the middle appears the nectarium, which has a resemblance of a disbowed body of a fly, of a purplish colour. Under the flower is situated a channelled oblong head, which after the flower is past, swells and becomes a seed-vessel filled with very small seeds. This flowers in June and July, and the seeds ripen in autumn.

The second sort grows naturally in Stoken Church woods in Oxfordshire, and in several parts of Westmoreland and Lancashire. This hath fleshy fibrous roots, not quite so thick as those of the former; the stalks rise more than a foot high, and are garnished with spear-shaped veined leaves, ending in acute points; they are three inches long and one broad, of a lucid green, and sit close to the stalk. The

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flowers are disposed alternately on the upper part of the stalk; they are white, and have three outer petals which are large, and two smaller within; in the center is situated the gaping nectarium, which appears to have two wings. This sort flowers about the same time as the former.

The third sort grows naturally in marshy woods in many parts of England; this hath a fleshy fibrous root, from which arise a single stalk a foot and a half high, garnished at bottom with sword-shaped veined leaves, four inches long and one broad, embracing the stalk with their base, ending in acute points. The upper part of the stalk is garnished with faded purplish-coloured flowers, disposed in a loose spike; they have five petals, inclosing a large nectarium like the body of a fly, with a yellowish head striped with purple and a white body; the lip which hangs down, is white and fringed on the edge. This sort flowers in July.

The fourth sort was discovered first in Hertfordshire, but since it has been found growing in many other places. The root of this is composed of fleshy fibres; the stalks rise more than a foot high, and are garnished with spear-shaped veined leaves, which embrace the stalks with their base. The stalk is terminated by a loose spike of white flowers, composed of five petals, and a large five-pointed nectarium which is shut; the germen is oblong and channelled; this afterward becomes a capsule of the same form, filled with small seeds. It flowers in July.

These plants are rarely kept in gardens, and being difficult to propagate, there are few who have attempted to keep them in gardens. They may be taken up from the places where they naturally grow, when their leaves begin to decay, and planted in a shady moist place, where they will thrive and flower.

SERJANIA. See PAULLINIA.

SERPENTARIA. See ARISTOLOCHIA.

SERPILLUM. See THYMUS.

SERRATULA. Dillen. Nov. Gen. 8. Lin. Gen. Plant. 831. Jacea. Tourn. Inst. R. H. 444. Saw-wort.

The CHARACTERS are,

The flowers are composed of many hermaphrodite florets, contained in one common cylindrical empalement, which is bellied, and the scales are spear-shaped, ending in acute points. The hermaphrodite florets are equal, funnel-shaped, and of one petal. The tube is inflexed, the brim is bellied, and cut into five points; they have each five short hair-like stamina terminated by cylindrical summits, and an oval-crowned germen, supporting a slender style, crowned by two oblong reflexed stigmas. The germen afterward turns to a vertical, oval, single seed, crowned with down, which ripens in the empalement.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which includes those plants whose flowers are composed of fruitful florets, and the stamina are connected to the style.

The SPECIES are,

1. SERRATULA (*Tinctoria*) foliis pinnatifidis, pinna terminali maxima. Hort. Cliff. 391. *Saw-wort with wing-pointed leaves, whose end lobe is the largest. Serratula. C. B. P. 235. Common Saw-wort.*
2. SERRATULA (*Altissima*) foliis lanceolato-oblongis serratis subtus tomentosis. *Saw-wort with oblong spear-shaped leaves, which are sawed, and downy on their under side. Serratula Noveboracensis, altissima, foliis Doriæ mollibus subincanis. Par. Bat. Prod. Tallest New-York Saw-wort, with soft Doria leaves, hoary on their under side.*
3. SERRATULA (*Glaucia*) foliis ovato-oblongis acuminatis serratis, floribus corymbosis, calycibus subrotundis. Flor. Virg. 92. *Saw-wort with oblong, oval, acute-pointed, sawed leaves, and flowers in a corymbus whose empalements are roundish. Serratula Virginiana, foliis rigidis. Par. Bat. Prod. 227. Virginian Saw-wort with stiff leaves.*
4. SERRATULA (*Squarosa*) foliis linearibus, calycibus squarrosis sessilibus acuminatis. Hort. Cliff. 392. *Saw-wort with linear leaves, and rough empalements which sit close*

close to the stalks, ending in acute points. *Cirsium tuberosum*, capitulis squarrosis Hort. Elth. 83. *Tuberosus melancholy Thistle with rough heads.*

5. *SERRATULA (Scariosa)* foliis lanceolatis integerrimis, calycibus squarrosis pedunculatis obtusis lateralibus. Lin. Sp. Plant. 818. *Saw-wort with entire spear-shaped leaves and rough empalements, having obtuse foot-stalks proceeding from the side of the stalks.* *Jacea latifolia* Virginiana, radice tuberosâ. Banist. Cat. *Broad-leaved Virginian Knap-weed with a tuberous root.*
6. *SERRATULA (Spicata)* foliis linearibus, floribus sessilibus lateralibus spicatis, caule simplici. Lin. Sp. Plant. 819. *Saw-wort with linear leaves, flowers in spikes from the side of the stalks sitting close, and a single stalk.* *Jacea non ramosa, tuberosâ radice, floribus plurimis rigidis perangustis.* Banist. Cat. 1927. *Unbranched Knap-weed with a tuberous root, and many narrow rigid flowers.*
7. *SERRATULA (Caroliniana)* foliis lanceolatis rigidis, acutè serratis, caule corymbofo. *Saw-wort with stiff spear-shaped leaves sharply sawed, and stalks forming a corymbus.* *Serratula Caroliniensis, virgæ pastoris folio.* Hort. Elth. 353. *Carolina Saw-wort with a Shepherd's Rod leaf.*
8. *SERRATULA (Præalta)* foliis oblongo-lanceolatis, integerrimis subtus hirsutis. *Saw-wort oblong, spear-shaped, entire leaves, hairy on their under side.* *Serratula Virginiana, persicæ folio subtus incano.* Hort. Elth. 356. *Virginian Saw-wort with a Peach-tree leaf, hoary on the under side.*
9. *SERRATULA (Alpina)* calycibus subhirsutis ovatis foliis indivisis. Lin. Sp. Plant. 816. *Saw-wort with oval empalements a little hairy.* *Cirsium humile montanum cynoglossi folio polyanthemum.* Mor. Hist. 3. p. 148. *Low mountain melancholy Thistle, with a Hound's-tongue leaf, and many flowers.*

The first sort grows naturally in moist woods and marshes in many parts of England, so is rarely admitted into gardens. There are two varieties of this, one with a white, and the other a purple flower. The root is perennial; the lower leaves are sometimes entire, and sometimes are cut almost to the midrib into many jags; they are smooth, of a deep green, and neatly sawed on their edges. The stalks rise two feet high, and are garnished with wing-pointed leaves, whose extreme lobe is much larger than the other; these are sawed on their edges; the upper part of the stalk divides into several foot-stalks, sustaining at the top oblong squamous heads or empalements, which include several hermaphrodite florets. These appear in July, and are succeeded by seeds which ripen in autumn.

The second sort grows naturally in North America; this hath a perennial root, from which come out several channelled stalks which rise seven or eight feet high, garnished with spear-shaped leaves from four to five inches long, and one inch broad in the middle, drawing to a point at each end; they are slightly sawed on their edges, and are downy on their under side, sitting close to the stalk; the upper part of the stalk divides into foot-stalks, which sustain purple flowers in scaly empalements. These appear the latter end of July, but are seldom succeeded by good seeds in England.

The third sort is a native of North America; the root is perennial, and the stalks rise six or seven feet high; they are purple and channelled. The leaves are oblong, oval, about three inches long, and an inch and a half broad in the middle, ending in acute points; they are stiff, sawed on their edges, and are of a light green on both sides. The flowers grow in a loose corymbus at the top of the stalk; they are purple, and have roundish empalements. This sort flowers in August, but the seeds seldom ripen in England.

The fourth sort grows naturally in Carolina, from whence I received the seeds. This hath a tuberous root, from which comes out a single stalk rising near three feet high, garnished with stiff linear leaves about three inches long, which are entire, and rough

to the touch, of a pale green on both sides. The upper part of the stalk is adorned with purple flowers, having oblong, rough, prickly empalements; these come out from the side of the stalk alternately, and the stalk is terminated by one head which is larger than the other; these sit close to the stalks. The flowers appear in August, but this sort never ripens seeds here.

The fifth sort grows naturally in most parts of North America; this has a large tuberous root, from which comes out one strong channelled stalk, which rises three or four feet high, closely garnished with narrow spear-shaped leaves which are entire; they are about three inches long, and half an inch broad. The upper part of the stalk is adorned with a long loose spike of purple flowers, which come out from the side upon pretty long blunt foot-stalks; they have large rough empalements, composed of wedge-shaped scales. The flowers on the top of the spike blow first, and are succeeded by the other downward, which is contrary to the greatest number of plants, whose flowers are ranged in spikes, for most of them begin to flower at the bottom, and are succeeded by those above. The flowers of this sort appear in August, but the seeds do not ripen here.

The sixth sort is a native of North America; this has a tuberous root, from which comes forth a single stalk rising from two to three feet high, garnished with very narrow smooth leaves, which at bottom are more than three inches long, but gradually diminish to the top; they are placed round the stalk without any order, sitting close to it at their base. The upper part of the stalk is adorned with smaller purple flowers than those of the former, sitting close to the stalk, forming a long loose spike; they appear about the same time as those of the former sort.

The seventh sort is also a native of North America; it has a perennial fibrous root, from which arise several strong purple stalks upward of six feet high; they are channelled, and garnished with spear-shaped leaves, which toward the bottom of the stalks are more than six inches long, and an inch and a half broad in the middle, drawing to points at both ends; they are gradually less to the top of the stalks, and are stiff, deeply sawed on their edges, of a pale green on their under side. The upper part of the stalk divides into small branches, forming a loose corymbus of purple flowers, which are irregular in height, some of the flowers standing upon shorter foot-stalks than the other; their empalements are round, and the scales terminate in bristly points. This sort flowers in July and August, but does not produce good seeds in England.

The eighth sort grows naturally in Carolina; this has a fibrous perennial root; the stalk is branching, and rises four feet high; the leaves are seven inches long, and an inch and a half broad in the middle, ending in acute points; they are entire and hairy on their under side, sitting close to the stalk. The flowers grow in loose bunches at the end of the branches; they have oval empalements, composed of a few scales which terminate in bristles. The flowers are of a pale purple colour, and appear late in summer, so are not succeeded by seeds here.

The ninth sort grows naturally on the tops of mountains in Wales and the North of England, and is but seldom kept in gardens. The root is perennial, from which come out one, two, or three stalks, which rise a foot and a half high; they are of a deep green colour, are channelled, and garnished with deep green leaves their whole length; those at the bottom are indented, but those on the upper part of the stalks are entire; they are about three inches long, and almost one broad, of a dark green colour. From the middle of the stalk upward, there are branches sent out from the side, which grow erect, and sustain at the top small bunches of purple flowers, which have oblong slender empalements a little hairy. The flowers appear in June and July.

The eight sorts which are first mentioned, are hardy perennial plants, so will thrive in the open air in England. The first is rarely admitted into gardens, but the other sorts are frequently preserved in the gardens of the curious. The fourth, fifth, and sixth sorts, have large knobbed roots; these are propagated only by seeds, which seldom ripen in England, so that the seeds must be procured from abroad. These should be sown on an east-aspected border, where the morning sun only comes; for if the seeds are exposed to the mid-day sun, they seldom succeed well. These seeds will often grow the first summer, if they are sown early in the spring, but sometimes they will remain in the ground a year before the plants appear; so that if they should not come up the first season, the ground should not be disturbed, and must be kept clean from weeds till the following spring, when, if the seeds were good, the plants will come up; when these appear they must be kept clean from weeds; and if they are too close, some of the plants should be carefully drawn out while they are young, and planted into another border of light loamy earth, four inches asunder; in this place they may remain till autumn, when these, and also those in the seed-beds, should be carefully removed to the places where they are designed to remain; the following summer these plants will flower, and the roots will abide several years, if they are planted in a light loamy soil not over wet.

The other perennial sorts may be propagated by parting of the roots; the best time for doing this is in autumn, when their stalks begin to decay; for when they are removed in the spring, if the season should prove dry, their roots will not be sufficiently established to flower well the same year. These plants should not be removed or parted oftener than every third year, if they are expected to grow strong; nor should they be parted into small heads, for those will make no figure the first year. As these plants grow tall, so they should be planted in the middle of large borders, or with other tall plants; they may be planted in spaces between shrubs, or on the borders of woods, where they will have a good effect during their continuance in flower; and as they require no other culture than to dig the ground between them every spring, and keep them clean from weeds, so they are proper furniture for such places.

These sorts are also propagated by seeds, when they can be obtained good; these may be sown in the same way as the bulbous-rooted kinds, and when the plants come up, they must be treated in the same manner, only that these should be allowed more room, for the fibres of their roots spread out on every side to a great distance; for which reason these plants should not be planted in small gardens, where they will overbear the neighbouring plants.

SEASUM. Lin. Gen. Plant. 700. Digitalis. Tourn. Inst. R. H. 156. Oily Grain.

The CHARACTERS are,

The flower has an erect permanent empalement of one leaf, cut at the top into five very short equal segments. It has one ringent petal, with a roundish tube the length of the empalement; the chaps are swollen, bell-shaped, and spreading; the brim is cut into five points, four of which are spreading and almost equal; the other is twice their length, oval, and erect. It has four stamina rising from the tube which are shorter than the petal, the two inner being shorter than the other, terminated by erect pointed summits, and an oval hairy germen, supporting a slender style longer than the stamina, crowned by a spear-shaped stigma divided in two parts. The germen afterward becomes an oblong, almost four-cornered capsule, which is compressed and acute-pointed, having four cells, filled with oval compressed seeds.

This genus of plants is ranged in the second section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two shorter stamina, and their seeds are included in capsules.

The SPECIES are,

1. SESASUM (*Orientalis*) foliis ovato-oblongis integris.

Hort. Cliff. 318. *Sesamum* with oblong, oval, entire leaves: Digitalis Orientalis, sesamum dicta. Tourn. Inst. 165. *Eastern Foxglove, called Sesamum.*

2. SESAMUM (*Indicum*) foliis inferioribus trifidis. Prod. Leyd. 292. *Sesamum* with trifid lower leaves. *Sesamum* alterum, foliis trifidis, *Orientalis* femine obscuro. Pluk. Alm. 344. *Another Eastern Sesamum, with trifid leaves and black seeds.*

3. SESAMUM (*Trifoliatum*) foliis omnibus trifidis. *Sesamum* with all the leaves trifid. *Sesamum* *Orientalis*, trifidum, flore niveo. Hort. Compt. *Eastern Sesamum, with a trifid leaf and snow white flower.*

The first sort is cultivated in great plenty in the Levant, but is supposed to have been brought there from India. It is an annual plant, rising with an herbaceous four-cornered stalk about two feet high, sending out a few short side-branches; the leaves are oblong, oval, a little hairy, and stand opposite. The flowers are produced in loose spikes at the top of the stalks; they are small, and of a dirty white colour, shaped somewhat like those of the Foxglove. These appear in July, and after the flowers are past, the germen turns to an oval acute-pointed capsule with four cells, filled with oval compressed seeds which ripen in autumn.

The second sort grows naturally in India; this is also an annual plant; the stalk rises taller than that of the former; the lower leaves are cut into three parts, which are the only differences between them.

The third sort grows naturally in Africa; this is also an annual plant, with a taller and more branched stalk than either of the former, and all the leaves are cut into three parts, in which it differs from both the other. I have raised two other species of this genus from seeds which were brought from Africa, but these being sown late in the spring, did but just shew their flowers before winter, so there could be no good seeds obtained from them. These grew near four feet high, the leaves of one sort were much longer than any of the other, and those toward the top of the stalk were divided into three, and some into four parts; the seeds of this were black, the other had broader leaves, which were sawed on their edges. The flowers were large and of a pale blue colour, and the seeds were of a pale yellow colour.

The first sort is frequently cultivated in all the eastern countries, and also in Africa, as a pulse; and of late the seeds of this have been introduced in Carolina by the African negroes, where they have succeeded extremely well. The inhabitants of that country make an oil from the seed, which will keep many years, and not take any rancid smell or taste, but in two years becomes quite mild; so that when the warm taste of the seed, which is in the oil when first drawn, is worn off, they use it as salad oil, and for all the purposes of sweet oil.

The seeds of this plant are also used by the negroes for food, which seeds they parch over the fire, and then mix them with water, and stew other ingredients with them, which makes an hearty food. Sometimes a sort of pudding is made of these seeds, in the same manner as with Millet or Rice, and is by some persons esteemed, but is never used for these purposes in Europe. This is called Benny, or Bonny, in Carolina. In England, these plants are preserved in botanic gardens as curiosities. Their seeds must be sown in the spring upon a hot-bed, and when the plants are come up, they must be transplanted into a fresh hot-bed to bring them forward. After they have acquired a tolerable degree of strength, they should be planted into pots filled with a rich, light, sandy soil, and plunged into another hot-bed, managing them as hath been directed for Amaranthuses, to which I shall refer the reader, to avoid repetition: for if these plants are not thus brought forward in the former part of the summer, they will not produce good seeds in this country; though after they have flowered, if the season is favourable, they may be exposed in a warm situation with other annual plants. When these plants have perfected their seeds they decay, and never continue longer than one season.

The seed of the first sort is mentioned in the list of officinal simples in the College Dispensatory, but is rarely used in medicine in England. From nine pounds of this seed which came from Carolina, there were upwards of two quarts of oil produced, which is as great a quantity as hath been known to be drawn from any vegetable whatever; and this, I suppose, might occasion its being called Oily Grain.

SESELI. Boerh. Ind. alt. 1. p. 50. Lin. Gen. Plant. 322. Wild Spiguel.

The CHARACTERS are,

It has an umbellated flower; the figure of the greater umbel is uncertain, the particular umbels are very short, multiplex, and almost globular. The principal umbel has no involucre, the particular ones have a many narrow-leaved involucre, which is as long as the umbel; the empalement of the flower is scarce discernible; the principal umbel is uniform. The flowers have five inflexed heart-shaped petals, which are a little unequal; they have each five awl-shaped stamina, terminated by single summits. The germen is situated under the flower, supporting two reflexed styles, crowned by obtuse stigmas. The germen afterward turns to a small, oval, channelled fruit, dividing into two parts, each containing one oval streaked seed, flat on one side and convex on the other.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. SESELI (*Montanum*) petiolis ramiferis membranaceis. Hort. Cliff. 103. *Seseli with membranaceous foot-stalks. Fœniculum sylvestre annuum, tragofelinum odore, umbella alba.* Bot. Paris. 54. *Annual wild Fennel smelling like Burnet Saxifrage, and a white umbel.*
2. SESELI (*Caruifolia*) foliis bipinnatis sublinearibus, petiolis basi membranaceis, feminibus ovalibus. Lin. Sp. Plant. 360. *Seseli with double-winged leaves almost linear, with a membranaceous base to the foot-stalks, and oval seeds.* Caruifolia. C. B. P. 158. *Carraway leaf.*
3. SESELI (*Glaucum*) petiolis ramiferis membranaceis oblongis integris, foliolis singularibus binatisque canaliculatis lævibus petiolo longioribus. Guett. 64. *Seseli with branching, oblong, entire, membranaceous foot-stalks, and the small leaves either single or by pairs, which are lightly channelled.* Fœniculum sylvestre glauco folio. Tourn. Inst. 311. *Wild Fennel with a gray leaf.*
4. SESELI (*Pumilum*) petiolis ramiferis membranaceis oblongis integris, foliis caulinis angustissimis. Hort. Cliff. 102. *Seseli with oblong, entire, membranaceous, branching foot-stalks, and very narrow leaves on the stalks.* Fœniculum sylvestre perenne, ferulæ folio brevior. Tourn. Inst. 311. *Wild perennial Fennel, with a shorter Giant's Fennel leaf.*
5. SESELI (*Tortuosum*) caule alto rigido, foliolis linearibus fasciculatis. Lin. Sp. Plant. 260. *Seseli with a tall stiff stalk, and very narrow leaves in clusters.* Fœniculum tortuosum. J. B. 3. p. 16. *Crooked or contorted Fennel.*
6. SESELI (*Ammoides*) petiolis membrana destitutis. Flor. Leyd. Prod. 112. *Seseli with foot-stalks without membranes.* Fœniculum Lusitanicum minimum acre. Tourn. Inst. 312. *The least acrid Portugal Fennel.*

The first sort grows naturally in France amongst the Corn; this rises with an erect stalk near two feet high, sending out branches from the side, and is garnished with short leaves divided into small segments or leaves like Hog's Fennel. At the foot-stalk of each branch or leaf is a bellied membrane, which embraces it. The stalk is terminated by an umbel of white flowers which appear in June, and the seeds ripen the beginning of August.

The second sort grows naturally in Germany; this hath a perennial root. The leaves are long, and made up of eight or nine pair of winged lobes which are cut like those of Parsley; the stalk rises near two feet and a half high, branching out into several divisions; at each of these there is a membrane embracing the base, and one small leaf composed of a few linear lobes. The stalks are terminated by com-

pound umbels of yellow flowers, which appear in June, and are succeeded by seeds which ripen in autumn.

The third sort grows naturally in uncultivated places in the south of France and Italy; this has a perennial root which runs deep in the ground, sending out slender smooth stalks near two feet high. The leaves are long and narrow, composed of seven or eight pair of wings, whose lobes are sometimes single, and at others are divided into two parts; they have a membrane embracing their foot-stalks, and are of a gray colour. The stalks are terminated by umbels of flowers, which are purple on their outside and white within; these appear in July and August, and the seeds ripen in autumn.

The fourth sort grows naturally on the dry hills in many parts of France and Italy; this has a perennial root, from which come out leaves like those of Spiguel, but the segments are broader and of a gray colour. The stalks rise a foot high, and are garnished with a few very narrow leaves, whose foot-stalks are embraced by a long entire membrane; they branch out on every side, and these are terminated by umbels of white flowers which appear in July, and are succeeded by seeds which ripen in autumn.

The fifth sort grows naturally in the south of France, Italy, and Spain; this has a thick ligneous root, from which come out stiff stalks near four feet high, which are crooked at their joints, and garnished with narrow leaves coming out in bunches. The stalks divide into slender branches, which have small umbels of flowers coming out of their sides, and are terminated by larger. The flowers are small, yellow, appear in July, and are succeeded by seeds which ripen in autumn.

The sixth sort is an annual plant, which grows naturally in Portugal. The leaves of this sort are like those of Spiguel, but are much smaller, and have a very acrid biting taste. The stalks rise four inches high, and sustain a small umbel of flowers which appear in July; and, if the season is warm, the seeds will ripen in autumn.

These plants are preserved in the gardens of botanists for the sake of variety, but at present their virtues are unknown; and as they have little beauty to recommend them, they are rarely admitted into other gardens.

These may be propagated by sowing their seeds, which is best done in autumn, for when the seeds are sown in the spring, they frequently lie in the ground till the next year before the plants will appear; whereas those which are sown in autumn, always rise the following spring. These seeds should be sown in drills, about eighteen inches asunder, in a bed of fresh earth, where they are designed to remain, and in the spring when the plants come up, they should be thinned where they are too close, leaving them about six inches distance in the rows; after this the plants will require no farther care, but to keep them constantly clear from weeds, and the second season they will produce seeds. The perennial sorts, which are permitted to remain after they have seeded, should have the ground gently dug every spring between the rows to loosen the earth, but there should be care taken not to injure their roots with the spade. These plants love a moist soil, for when they are sown on dry ground, they do not thrive near so well, and seldom perfect their seeds, unless the season proves moist, or they are duly watered.

SHERARDIA. Dillen. Gen. Nov. 3. Lin. Gen. Plant. 112. Aparine. Tourn. Inst. R. H. 114. Little Field Madder.

The CHARACTERS are,

The flower has a small, four-pointed, permanent empalement sitting upon the germen; it has one long tubulous petal, cut into four plain acute parts at the brim; it has four stamina situated on the top of the tube, terminated by single summits, and an oblong twin germen below the flower, supporting a slender bifid style crowned by two beaded stigmas. The germen afterward becomes an oblong crowned fruit, containing two oblong seeds which are separated.

This

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This genus of plants is ranged in the first section of Linnæus's fourth class, which includes those plants whose flowers have four stamina and one style. This title of the genus was given to it by Dr. Dillenius, in honour of the late Dr. William Sherard, whom Boerhaave calls the prince of botanists.

We have but one SPECIES of this genus, viz.

SHERARDIA (*Arvensis*) foliis omnibus verticillatis, floribus terminalibus. Lin. Sp. Plant. 102. *Sherardia with all the leaves placed in whorls round the stalks, and flowers terminating them.* Aparine lupina, pumila, flore cæruleo. Tourn. Inst. 114. *Low lupine Clivers with a blue flower.*

It grows naturally amongst the Corn in many parts of England; it is an annual plant, with trailing stalks which spread on the ground, are sometimes a foot long, and garnished with short acute-pointed leaves growing in whorls, some of which have four, others five and six, and some have eight leaves in each whorl. From the side of the stalks come out the foot-stalks of the flowers, which sustain one whorl of leaves upon which the flowers sit very close; there are generally five or six flowers upon each whorl; they are blue, and have pretty long tubes, which are cut into four segments at the top spreading open. These flowers appear in June, and their seeds ripen in autumn.

SHERARDIA. Vaill. See VERBENA.

SIBBALDIA. Lin. Gen. 393. Bastard Cinquefoil.

The CHARACTERS are,

The flower hath a permanent empalement of one leaf, cut half way into ten segments, and five oval petals inserted into it, and five hair-like stamina which are shorter than the corolla, joined to the empalement, terminated by small obtuse summits. It hath five oval short germen, with a style fastened to the middle, crowned by beaded stigmas; the calyx incloses five oblong seeds.

This genus of plants is ranged in the fifth section of Linnæus's fifth class, which includes such plants whose flowers have five stamina and five styles.

The SPECIES are,

1. SIBBALDIA (*Procumbens*) foliolis tridentatis. Flor. Lap. 111. *Trailing Bastard Cinquefoil.* Fragariæ sylvestris affinis planta, flore luteo. Sibb. Scot. 2. p. 25. *A plant near of kin to the Wild Strawberry.*
2. SIBBALDIA (*Octopetala*) floribus octopetalis. *Bastard Cinquefoil with eight petals to the flower.*

The first sort has been known many years; this grows upon moist ground on the Highlands in Scotland, and is with difficulty preserved in gardens; it is a low plant, whose leaves end in three points; the flowers are small and yellow, but it rarely produces seeds in gardens, therefore the plants must be procured from the places where they naturally grow; and if they are planted in a moist soil and a shady situation, they will thrive tolerably well and produce flowers.

The second sort has been lately discovered in the west part of Scotland; this hath larger flowers than the first, and have eight petals to each.

This may be treated in the same manner as the other sort.

SIBTHORPIA. Lin. Gen. Plant. 775. Bastard Moneywort.

The CHARACTERS are,

The flower hath a permanent empalement of one leaf, cut into five spreading segments; it hath one spreading petal divided into five equal parts, and four hair-like stamina, terminated by heart-shaped summits, with a roundish compressed germen, supporting a cylindrical style the length of the flower, crowned by a depressed stigma; the empalement becomes an orbicular compressed capsule opening with two valves, containing roundish convex seeds.

This genus of plants is ranged in the second section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two short stamina, and the seeds are included in a capsule.

We have but one SPECIES of this genus in England, viz.

SIBTHORPIA (*Europæa*) foliis reniformibus subpeltatis crenatis. Amœn. Acad. 3. p. 22. *Bastard Moneywort, with kidney-shaped crenated leaves.*

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This plant grows naturally in moist places in Cornwall, Devonshire, and other parts of England, from whence the plants or seeds may be procured, which, if planted or sown in pots, and placed in the shade and kept moist, will thrive very well in gardens.

SICYOS. Lin. Gen. Plant. 971. Sicyoides. Tourn. Inst. 103. Single-seeded Cucumber.

The CHARACTERS are,

It hath male and female flowers on the same plant; the male flowers have a bell-shaped empalement of one leaf, with five indentures. The petal is bell-shaped, of one leaf, growing on the empalement; they have each three stamina, which are united above, terminated by summits joined in a head. The female flowers are like the male, and sit upon the germen; they have no stamina, but the germen supports a cylindrical style crowned by a thick three-pointed stigma. The germen afterward becomes an oval fruit set with bristly hairs, having one cell, containing a single seed of the same shape.

This genus of plants is ranged in the tenth section of Linnæus's twenty-first class, which includes those plants which have male and female flowers on the same plant, and their stamina are connected together. Tournefort places it in the seventh section of his first class, which contains the herbs with a bell-shaped flower of one petal, whose empalement turns to a fruit for the most part fleshy.

The SPECIES are,

1. SICYOS (*Angulata*) foliis angulatis. Hort. Cliff. 452. *Sicyos with angular leaves.* Sicyoides Americana, fructu echinato, foliis angulatis. Tourn. Inst. 103. *American, prickly, one-seeded Cucumber with angular leaves.*
2. SICYOS (*Laciniata*) foliis laciniatis. Lin. Sp. Plant. 1013. *Sicyos with cut leaves.* Sicyoides Americana, fructu echinato, foliis laciniatis. Plum. Cat. 3. *American, prickly, one-seeded Cucumber with cut leaves.*

The first sort grows naturally in North America; this is an annual plant, which rises with two large seed-leaves like those of the Cucumber; the stalk is trailing, and has tendrils, by which it fastens itself to the neighbouring plants, and will rise fifteen or sixteen feet high, dividing into many branches, which are garnished with angular leaves like those of the Cucumber. The flowers come out upon long foot-stalks from the side of the branches, standing in clusters; they have male, which are barren flowers, and female fruitful flowers on the same plant, which are small, of a pale sulphur colour, and are succeeded by prickly oval fruit containing one seed; the flowers appear in June and July, and the seeds ripen in autumn. If these are permitted to scatter, the plants will come up in the spring better than when sown by hand, and require no other care but to keep them clean from weeds. These plants ramble, and take up too much room for small gardens, and therefore should be allowed a place near a hedge upon which they may climb; they do not bear transplanting well, unless when they first come up.

The second sort grows naturally in the West-Indies; this is also an annual plant, with trailing stalks like the former, but the leaves of this are cut into several segments. The flowers are larger than those of the former, and are of a deeper colour; the fruit are not quite so large, nor so closely armed with prickly hairs, in which consists their difference.

This sort is not so hardy as the first, therefore whoever has a mind to cultivate it, must sow the seeds upon a hot-bed in the spring, and treat the plants in the same way as Cucumbers and Melons, keeping them under frames, otherwise the seeds will not ripen in England; but the plants will require more room than either of the former, so that one or two plants will be enough for curiosity, as they have no great beauty or use.

SIDA. Lin. Gen. Plant. 747. Malvinda. Dillen. Hort. Elth. 171, 172. Indian Mallow.

The CHARACTERS are,

The empalement of the flower is single, permanent, angular, and five-pointed. The flower is of one petal, cut into five broad segments which are joined at their base, and are indented

indented at their points; it has many stamina which are joined in a column at bottom, but spread open above, and are terminated by roundish summits, and an orbicular germen, supporting a short multifid style, crowned by beaded stigmas. The germen afterward becomes a five-cornered capsule having five cells, each containing an angular roundish seed.

This genus of plants is ranged in the third section of Linnæus's sixteenth class, which includes those plants whose flowers have their male and female organs joined in one body, and have many stamina. To this genus he joins the *Abutilon* of Tournefort, but as the fruit of that genus is composed of many capsules, and these have several seeds in each, that character is sufficient to separate the two genera, which may be the more necessary as there are many species of each.

The SPECIES are,

1. *SIDA (Ulmifolia)* foliis ovato-lanceolatis ferratis, floribus solitariis axillaribus, femine rostrato bidente. *Indian Mallow with oval, spear-shaped, sawed leaves, single flowers on the side of the stalk, and seeds with two horns.* *Malvinda ulmifolia* femine rostrato bidente. Act. Phil. Lond. 399. *Indian Mallow with an Elm leaf, and seeds with two horns or teeth.*
2. *SIDA (Carpinifolia)* caule ramoso hirsuto, foliis lanceolatis ferratis floribus confertis axillaribus, femine rostrato simplici. *Sida with a branching hairy stalk, spear-shaped sawed leaves, flowers in clusters from the wings of the stalk, and seeds with a single horn or tooth.* *Malva erecta minor, carpini folio, feminibus singulis simplici aculeo longiore donatis.* Sloan. Cat. *Smaller upright Mallow with a Hornbeam leaf, and the seeds have a single longer horn.*
3. *SIDA (Angustifolia)* caule erecto ramoso, foliis linearilanceolatis dentatis subtus villosis, pedunculis axillaribus unifloris. *Sida with an erect branching stalk, linear spear-shaped leaves, hairy on their under side, and foot-stalks with one flower at the wings of the stalks.* *Malvinda pimpinellæ folio angustiore femine bidente.* Act. Phil. Lond. vol. 35. *Indian Mallow with a narrow Burnet leaf, and seeds with two horns.*
4. *SIDA (Pimpinellifolia)* foliis cordatis ferratis, pedunculis unifloris axillaribus, femine rostrato bidente. *Sida with heart-shaped sawed leaves, foot-stalks with one flower from the wings of the stalk, and seeds with two horns.* *Malvinda pimpinellæ majoris folio, femine bidente.* Act. Phil. Lond. 399. *Indian Mallow with a greater Burnet leaf, and seeds with two teeth.*
5. *SIDA (Jamaicensis)* foliis ovato-lanceolatis ferratis, floribus axillaribus sessilibus, femine tridente. *Sida with oval spear-shaped leaves which are sawed, flowers sitting close at the wings of the stalks, and seeds with three teeth.* *Malvinda profundius ferrato folio, femine tridente.* Act. Phil. Lond. 399. *Indian Mallow with leaves deeply sawed, and seeds with three teeth.*
6. *SIDA (Villosa)* caule erecto hirsuto, foliis subcordatis sessilibus ferratis subvillosis, floribus confertis axillaribus sessilibus. *Sida with a hairy stalk, leaves almost heart-shaped sitting close to the stalk, which are a little woolly, and flowers in clusters sitting close to the stalk.* *Malvinda carpini folio villoso, floribus conglobatis ad foliorum alas.* Houft. MSS. *Indian Mallow with a Hornbeam leaf, and clustered flowers at the wings of the leaves.*
7. *SIDA (Alnifolia)* foliis orbiculatis plicatis ferratis. Hort. Cliff. 346. *Sida with orbicular plaited leaves which are sawed.* *Malvinda itellata alnifolia.* Hort. Elth. 172. *Starry Indian Mallow with an Alder leaf.*
8. *SIDA (Cordifolia)* foliis cordatis subangulatis ferratis villosis. Lin. Sp. Plant. 684. *Sida with heart-shaped leaves almost angular, which are woolly and sawed.* *Malvinda bicornis, ballotæ folio molli.* Hort. Elth. 211. *Indian Mallow with two horns, and a soft black Hornbeam leaf.*
9. *SIDA (Hirsuta)* foliis orbiculato-cordatis crenatis, caule petiolisque hirsutis, pedunculis longis axillaribus unifloris. *Sida with orbicular, heart-shaped, crenated leaves, the stalks and foot-stalks of the leaves hairy, and*

long foot-stalks from the wings of the stalk with one flower.

10. *SIDA (Capitata)* capitulis pedunculatis triphyllis septemfloris. Lin. Act. Upsal. 1743. p. 137. *Sida with heads on foot-stalks which have three leaves and seven flowers.* *Malva aspera major aquatica, ex hortensium seu rosarum genere, flore minore luteo, femine aculeato.* Sloan. Cat. Jam. 96. *Greater, aquatic, rough Mallow of the garden, or Rose Mallow Kind, with small yellow flowers and prickly seeds.*
11. *SIDA (Hirsutissima)* foliis lanceolatis ferratis villosis, caule erecto piloso, pedunculis axillaribus unifloris. *Sida with spear-shaped, woolly, sawed leaves, an erect hairy stalk, and foot-stalks from the wings of the stalk with one flower.* *Malvinda hirsutissima carpini folio longiore floribus singulis ad foliorum alas, femine bidente.* Houft. MSS. *Indian Mallow very hairy, with a longer Hornbeam leaf, and single flowers at the wings of the leaves, and seeds with two teeth.*
12. *SIDA (Abutilifolia)* foliis cordatis crenatis acuminatis villosis caule petiolisque pilosis, pedunculis axillaribus unifloris. *Sida with heart-shaped, pointed, crenated, woolly leaves, and the stalks and foot-stalks hairy, and foot-stalks with one flower at the wings of the stalk.* *Malvinda abutili folio minore, caulibus hirsutissimis, floribus ad foliorum alas.* Houft. MSS. *Indian Mallow with a smaller yellow Mallow leaf, very hairy stalks, and flowers proceeding from the wings of the leaves.*
13. *SIDA (Ciliaris)* caulibus procumbentibus, foliis oblongo-ovatis ferratis hirsutis, floribus sessilibus terminalibus. *Sida with trailing stalks, oblong, oval, hairy, sawed leaves, and flowers sitting close at the end of the branches.* *Malva minor supina, betonicæ folio, flore coccineo feminibus asperis.* Sloan. Cat. Jam. 97. *Smaller supine Mallow with a Betony leaf, a scarlet flower, and rough seeds.*
14. *SIDA (Glabra)* foliis cordatis ferratis acuminatis glabris, caule ramoso, pedunculis axillaribus unifloris. *Sida with heart-shaped, sawed, acute-pointed, smooth leaves, a branching stalk, and foot-stalks from the wings of the stalks with one flower.* *Malvinda abutili folio acuminato, floribus parvis luteis, ex alis foliorum, femine bidente.* Houft. MSS. *Indian Mallow with a pointed, yellow, Mallow leaf, and small yellow flowers at the wings of the leaves, and seeds with two teeth.*
15. *SIDA (Sericea)* caulibus procumbentibus, foliis ovatis ferratis tomentosis nitidis, floribus solitariis axillaribus sessilibus. *Sida with trailing stalks, oval, sawed, neat, woolly leaves, and single flowers sitting close to the wings of the stalk.* *Malvinda supina, foliis subrotundis sericeis, feminibus non dentatis.* Houft. MSS. *Supine Indian Mallow, with roundish fatten leaves, and the seeds without teeth.*
16. *SIDA (Americana)* foliis subcordatis crenatis subtus tomentosis, floribus aggregatis axillaribus sessilibus. *Sida with almost heart-shaped leaves, which are crenated and woolly on their under side, and flowers in clusters sitting close at the wings of the stalk.* *Malva Americana abutili folio, floribus conglobatis ad foliorum alas.* Houft. MSS. *Indian Mallow with a yellow Mallow leaf, and flowers in clusters at the wings of the leaves.*
17. *SIDA (Pilosa)* foliis subovatis ferratis nervosis subtus tomentosis, caule piloso, pedunculis axillaribus multifloris. *Sida with veined sawed leaves almost oval, and woolly on their under side, a hairy stalk, and foot-stalks with many flowers at the wings of the stalks.* *Malvinda carpini folio, flore luteo caule & averfa foliorum parte villosa.* Houft. MSS. *Indian Mallow with a Hornbeam leaf, and a yellow flower whose stalk and the under part of the leaf are hairy.*
18. *SIDA (Fruticosa)* foliis lanceolatis inæqualiter ferratis acuminatis, floribus capitatis terminalibus, caule fruticoso. *Sida with spear-shaped acute-pointed leaves unequally sawed, flowers collected in heads at the end of the branches, and a shrubby stalk.* *Malvinda frutescens ulmifolia, feminibus singulis tribus aculeis lappaceis armatis.* Houft. MSS. *Indian Mallow with an Elm leaf, and single seeds armed with three burry prickles.*

19. SIDA (*Alba*) foliis cordatis acuminatis ferratis nervosis, floribus aggregatis axillaribus sessilibus. *Sida* with acute-pointed, heart-shaped, sawed, veined leaves, and flowers in clusters sitting close to the wings of the stalk. *Malvinda* foliis subrotundis acuminatis, floribus albis conglomeratis ad foliorum alas. Houft. MSS. *Indian Mallow* with roundish acute-pointed leaves, and white flowers in clusters at the wings of the leaves.

These plants grow naturally in the West-Indies, from whence I have received the seeds of three or four species by the title of Broom Weed; and I have been informed that the inhabitants cut these plants in the same manner as we do Heath, and make it up into brooms for sweeping. Sometimes I have received the seeds by the title of West-India Thea, so that I suppose the leaves of these plants are sometimes used as the Thea. There are certainly more species of this genus than are here mentioned, which have escaped the notice of those who have been in the West-Indies in search for plants, for we frequently have new sorts come up in the earth which is brought from thence with other plants. Those here enumerated are undoubtedly distinct species, for I have cultivated them several years, and have never observed either of them change, when raised from seeds.

The first sort grows as far north as Virginia, from whence I have several times received the seeds; this grows with an upright branching stalk three or four feet high, garnished with oval spear-shaped leaves, about two inches long and one broad, sawed on their edges, and sit close to the branches. The flowers come out singly from the wings of the stalks, standing upon very short foot-stalks; they have a single empalement, cut into five obtuse segments, and are small, of a pale copper colour, and of one petal, which is cut into five parts almost to the bottom, where they are joined. In the center arises a small column composed of the several stamina and style which are connected together at bottom, but are separated above. When the flowers decay, the germen turns to a capsule with five cells inclosed by the empalement; in each cell is contained one angular seed, gibbous on one side, having two horns or teeth at the point. This plant flowers till the frost stops it, and the seeds ripen in autumn.

The second has hairy branching stalks which rise near three feet high. The branches of this come out from the bottom almost to the top, and form a pyramidal bush; the leaves are longer and narrower, the saw on the edges deeper, of a brighter green than those of the former, and stand upon short foot-stalks; the flowers come out at the foot-stalks of every leaf; they are single toward the bottom of the stalk, but upward they are in clusters; the empalement of the flower is in five angles, each being terminated by a bristly hair; the flowers are of a pale sulphur colour, and the seeds have but one horn or tooth. It flowers at the same time with the former.

The third sort rises with a slender ligneous stalk about two feet high, sending out many erect branches, which are garnished with narrow spear-shaped leaves an inch and a half long, and a third broad in the middle; they are indented on their edges, and end in acute points, having pretty long slender foot-stalks. The flowers come out singly from the wings of the stalks; they are small, of a pale yellow colour, and appear at the same time with the former.

The fourth sort has very slender stalks, which seldom rise much more than a foot high, sending out a few slender branches, garnished with small heart-shaped leaves which are sawed on their edges, and are a little hoary on their under side, standing upon pretty long foot-stalks. The flowers are small, of a pale yellowish colour, and come out singly from the wings of the stalk; these are succeeded by seeds having two teeth. It flowers at the same time with the former.

The fifth sort has a hairy stalk covered with a dark brown bark, and rises three feet high, sending out many branches from the side, which are garnished

with oval spear-shaped leaves standing upon long foot-stalks; they are more than two inches long, and one and a quarter broad, ending in an obtuse point, and are deeply sawed on their edges. The flowers come out by pairs at the foot-stalk of each leaf, sitting close to the stalk; they are larger than those of the former sorts, and of a deeper yellow colour; the seeds of this are larger, and have three teeth.

The sixth sort rises with a ligneous hairy stalk between three and four feet high, sending out a few slender branches toward the top. The leaves are a little woolly, and sit close to the stalk; they are near two inches long, and one broad near their base, being almost heart-shaped; they are veined, and sawed on their edges. The flowers come out in clusters on the side of the branches, to which they sit very close; they have hairy empalements, cut into acute segments at the top; they are small, of a pale yellow colour, and appear at the same time with the former, and the seeds have two teeth.

The seventh sort has a slender ligneous stalk which rises more than two feet high, sending out several slender branches garnished with roundish leaves having long foot-stalks, and are a little hairy on their under side. The flowers come out at the foot-stalks of the leaves, sometimes singly, and at others there are two or three upon slender foot-stalks; they are of a pale copper colour, and appear at the same time with the former.

The eighth sort rises with an herbaceous stalk more than three feet high, sending out several erect branches from the sides, which are garnished with heart-shaped leaves two inches and a half long, and two broad; they are sawed on their edges, are of a light green colour, soft to the touch, and stand upon very long foot-stalks which are hairy. The flowers stand upon long foot-stalks which come out from the wings of the stalk; they are small, of a sulphur colour, and appear at the same time with the former.

The ninth sort has very slender stiff stalks, which are covered with fine hairs, and rise a foot and a half high, sending out a few side branches, which are garnished with roundish heart-shaped leaves two inches long, and one inch and three quarters broad at the base; they are thin, of a light green colour, crenated on their edges, and stand upon long, slender, hairy foot-stalks. The flowers come out upon long foot-stalks from the wings of the stalks singly; their empalements terminate with ten stiff acute points or hairs; the flowers are small and white, appearing at the same time with the former.

The tenth sort rises with an herbaceous prickly stalk near four feet high, sending out several branches, which are garnished with rough hairy leaves standing upon long foot-stalks. These are of different forms, some are divided into five obtuse lobes, others into three, some are hollowed on the sides in shape of a fiddle; they are indented on their edges, and are of a pale green colour. The flowers are collected in heads, which stand upon very long hairy foot-stalks arising from the wings of the stalks. Under each head are placed three obtuse small leaves, upon which rest seven pale yellow flowers which are small, and are almost hid by their empalements; these are succeeded by seeds having acute spines. This flowers at the same time as the former.

The eleventh sort rises with a ligneous stalk three feet high, which is covered with yellowish hairs very closely garnished with spear-shaped hairy leaves sitting close to the stalks; they are two inches long, and one broad in the middle, sawed on their edges and of a pale green on their under side. The flowers come out singly from the wings of the stalk, standing upon short foot-stalks; they are small, white, and appear about the same time with the former.

The twelfth sort rises with very slender infirm stalks three feet high, covered with long white hairs, and garnished with soft, woolly, heart-shaped leaves, sitting upon long, slender, hairy foot-stalks. The

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leaves are little more than one inch long, and three quarters broad at their base, and are crenated on their edges. The flowers stand upon long slender foot-stalks which arise from the wings of the stalk, two of them generally coming out at each leaf; they are of a pale yellow colour, and appear at the same time with the former.

The thirteenth sort has many trailing stalks, which divide into slender branches, covered with a light brown bark, and garnished with small, oblong, oval leaves sawed on their edges, and hairy on their under side, standing upon short foot-stalks. The flowers are produced in small clusters sitting close at the end of the branches; they are small, of a bright scarlet colour, and are succeeded by seeds having two stiff bristly teeth. This flowers about the same time as the former.

The fourteenth sort hath smooth round stalks which rise three feet high, sending out long slender branches. The leaves are smooth, heart-shaped, of a light green colour, and stand upon long foot-stalks; the lower leaves are near three inches long, and almost two broad at their base, sawed on their edges, and ending in acute points. The flowers stand upon very long foot-stalks, arising from the wings of the stalks singly; they are small, and of a whitish yellow colour, appearing at the same time with the former.

The fifteenth sort sends out several stalks from the root, which spread flat on the ground, sending out several short side branches; the stalks grow nine or ten inches long, and are garnished with oval fatty leaves sawed on their edges, and have short foot-stalks; the flowers come out singly at the wings of the stalks, sitting very close thereto; they are small, of a yellow colour, and appear at the same time with the former, and are succeeded by seeds which have no teeth.

The sixteenth sort has a ligneous stalk with a purplish bark, rising two feet high, sending out several branches from the lower part. The leaves are pretty thick, and almost heart-shaped, ending with obtuse points; they are crenated on their edges, and woolly on their under side; they are an inch and a half long, and three quarters broad near their base, standing upon pretty long foot-stalks, and have many veins which arise from the midrib, and diverge to the borders. The flowers are of a pale yellow colour, and are gathered in clusters sitting close at the wings of the stalk; their empalements are hairy, and cut into many acute segments at the top. This flowers at the same time with the former, and the seeds have two teeth at their points.

The seventeenth sort has a ligneous stalk which rises four feet high, covered over with brown hairs, sending out a few long slender branches, the lower parts of which are garnished with oval leaves an inch and a half long, and three quarters broad; they are slightly sawed on their edges, have many longitudinal veins, and are downy on their under side. The upper part of the branches are destitute of leaves more than a foot in length, and from their sides come out foot-stalks two inches long, sustaining several small yellow flowers in clusters, having hairy empalements, which are cut at the top into several acute segments. This sort flowers at the same time with the former.

The eighteenth sort was discovered by the late Dr. William Houstoun, growing naturally at La Vera Cruz in New Spain; this rises with a strong shrubby stalk six or seven feet high, covered with a rough brown bark, and sends out several ligneous branches from the side, which are hairy, and garnished with spear-shaped leaves standing upon long foot-stalks; they are six inches long, and two broad in the middle, ending in acute points, and are unequally sawed on their edges, some of the indentures being large and deep, others are small and shallow, and do not extend so far from the border. The upper surface of the leaves are of a dark green, and their under is of a pale or light green colour. The flowers are collected in heads, standing upon long naked foot-stalks which

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terminate the branches; each of these heads contain seven or eight flowers, whose petals extend much beyond their empalements. The flowers are of a pale sulphur colour when they first open, but afterward fade to an almost white; their empalements are smooth, but are terminated by five hairy points which stand erect. The flowers being past, the germen swells to a short roundish capsule sitting in the empalement of the flower, having five cells, each containing one angular seed, having three sharp teeth which are burry, and stick to the clothes of those who rub against them when ripe.

The nineteenth sort was discovered by the late Dr. Houstoun, growing naturally in Jamaica; this rises with a shrubby stalk seven or eight feet high, sending out several very slender branches, extending to two feet or more in length, and bending downward at their ends; they are garnished at each joint (which are two inches asunder) by one large heart-shaped leaf, standing upon a pretty long foot-stalk; they are above four inches long, and two inches and a half broad near their base, sawed on their edges, and run out to a long sharp point, having many strong veins which rise from the midrib, and diverge toward their borders; they are of a light green on their upper surface, and pale on their under. The flowers grow in clusters at the wings of the stalks; those on the lower part of the branches are formed in close obtuse spikes about an inch in length, but on the upper part of the branches they are in globular heads which are placed nearer together, and have no leaves under them, the branches being terminated by one of these heads. The empalements of the flowers end with five acute hairy points; the flowers are small, and when they first open are white, but afterward they fade to a brownish colour. When these are past, the germen becomes a roundish capsule with five cells, sitting in the empalement of the flower, each cell having one angular seed with two teeth.

These plants are most of them annual in England, but some of them are of longer duration in their native countries, and might be so here, if they were placed in a warm stove in winter; but as most of them perfect their seeds the same year, if the plants are brought forward in the spring, few persons have room in their stoves to receive these plants, as there are so many perennial exotic plants at present in the English gardens, which require a warm stove to preserve them.

They are propagated by seeds, which should be sown upon a moderate hot-bed the beginning of April, and when the plants are come up fit to remove, they should be transplanted to another hot-bed, planting them four inches distance every way; they must be shaded from the sun till they have taken new root, and then they must have a large share of free air admitted to them when the weather is mild, to prevent their drawing up weak; they will also require water pretty frequently. If the plants thrive well, they will have strength enough to be fit to transplant in the open air; for which purpose they should be gradually hardened, and the beginning of June they may be taken up with balls of earth to their roots, and planted in a warm sheltered part of the garden, at about three feet distance, observing to shade and water them until they have taken new root; after which they will require no other care but to keep them clean from weeds. In July the plants will begin to flower, and there will be a continued succession of flowers until the frost comes on. If the season proves warm, they will ripen their seeds very well in autumn; but lest these should miscarry by the unfavourableness of the season, it may be proper to put one plant of each sort in pots filled with light kitchen-garden earth, placing them in the shade till they have taken new root, and then they may be removed to a warm situation, where they will thrive very well in a good season; but if the summer proves cold, they should be placed in a dry airy glass-case, where they may be kept warm, which will ripen their seeds.

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The eighteenth species will not flower the first year, so the plants must be placed in a warm stove in autumn, and during the winter they must be treated in the same way as other tender plants from the same country. The following summer they will flower and produce ripe seeds, but the plants are not of long duration, so that there should be a succession of young plants raised from seeds.

SIDERATION, a blasting of trees or plants by an easterly wind, of excessive heat or drought.

SIDERITIS. Tourn. Inst. R. H. 191. tab. 90. Lin. Gen. Plant. 632. [of Σίδης, iron, q. Iron-herb; so Dioscorides calls those herbs, that are good against wounds made by the sword. It is also called Ferrum matrix, on the same account; also Herba Judaica, because the Jews in old time made use of this herb in medicine.] Ironwort; in French, Crapaudine.

The CHARACTERS are,

The flower has an oblong tubulous empalement of one leaf, cut into five segments at the top. The flower is of the lip kind, of one petal, almost equal; the tube is oblong and cylindrical, the chaps oblong and taper. The upper lip is erect, and cut into two acute segments, the under lip is cut into three; the two side segments are acute, the middle is round and crenated. It has four stamina within the tube, two of which are as long as the tube, the other are shorter, terminated by twin summits; and a four-pointed germen supporting a slender style a little longer than the stamina, crowned by two stigmas, the upper being cylindrical, concave, and torn, the lower is short and membranaceous. The germen afterward turn to four seeds, which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which contains those plants whose flowers have two long and two shorter stamina, and the seeds are naked in the empalement.

The SPECIES are,

1. SIDERITIS (*Hirsuta*) foliis lanceolatis obtusis dentatis pilosis, bracteis dentato-spinosis, caule hirsuto, spicis interruptis elongatis. Lin. Sp. Plant. 803. *Ironwort with spear-shaped, obtuse, hairy, indented leaves, a hairy stalk, and long interrupted spikes of flowers.* Sideritis hirsuta procumbens. C. B. P. 233. *Hairy trailing Ironwort.*
2. SIDERITIS (*Romana*) herbacea ebracteata, caulibus spinosis, lacinia superiore majore ovata. Lin. Sp. Plant. 802. *Herbaceous Ironwort with prickly empalements, the upper segment being oval and larger than the other.* Sideritis verticillis spinosis, minor procumbens. Mor. Hist. 3. p. 388. *Smaller trailing Ironwort with prickly whorls.*
3. SIDERITIS (*Perfoliata*) herbacea hispido-pilosa, foliis superioribus amplexicaulibus. Lin. Sp. Plant. 802. *Hairy, stinging, herbaceous Ironwort, whose upper leaves embrace the stalks.* Sideritis Orientalis, phlomidis folio. Tourn. Cor. 12. *Eastern Ironwort with a Jerusalem Sage leaf.*
4. SIDERITIS (*Oleæfolia*) tomentosa, foliis lineari-lanceolatis sessilibus, calycibus spinosis. *Woolly Ironwort with narrow spear-shaped leaves sitting close to the stalks, and prickly empalements to the flowers.* Sideritis incana, oleæ folio. Bocc. Mus. *Hairy Ironwort with an Olive leaf.*
5. SIDERITIS (*Scordioides*) foliis lanceolatis acutis dentatis, bracteis ovatis dentato-spinosis, calycibus æqualibus, spicis ovatis. Lin. Sp. Plant. 803. *Ironwort with spear-shaped, acute, indented leaves, oval prickly bractea, equal empalements, and oval spikes of flowers.* Sideritis foliis hirsutis profundè crenatis. C. B. P. 233. *Ironwort with hairy leaves deeply crenated.*
6. SIDERITIS (*Syriaca*) fruticosa tomentoso-lanata, foliis lanceolatis integerrimis floribus verticillatis. Lin. Sp. Plant. 801. *Shrubby, downy, woolly Ironwort, with spear-shaped entire leaves, and flowers in whorls.* Sideritis Cretica tomentosa candidissima, flore luteo. Tourn. Cor. 12. *The whitest downy Ironwort of Candia.*
7. SIDERITIS (*Hispanica*) fruticosa, foliis lanceolatis integerrimis, floribus spicatis terminalibus, calycibus spinosis. *Shrubby Ironwort with spear-shaped entire leaves, and spiked flowers terminating the stalks, having prickly*

empalements. Sideritis Hispanica frutescens seu lignosior. Tourn. Inst. 192. *Shrubby, or ligneous Spanish Ironwort.*

8. SIDERITIS (*Hyssopifolia*) foliis lanceolatis glabris integerrimis, bracteis cordatis dentato-spinosis, calycibus æqualibus. Lin. Sp. Plant. 575. *Ironwort with smooth, entire, spear-shaped leaves, heart-shaped, prickly, indented bractea, and equal empalements.* Sideritis Alpina hyssopifolia. C. B. P. 233. *Alpine Ironwort with a Hyssop leaf.*

9. SIDERITIS (*Canariensis*) fruticosa tomentosa, foliis cordato-oblongis acutis petiolatis spicis verticillatis. Lin. Sp. Plant. 574. *Shrubby woolly Ironwort with heart-shaped oblong leaves, and the flowers growing in whorls.* Stachys Canariensis, frutescens, verbasci folio. Tourn. Inst. 186. *Shrubby Base Horehound of the Canaries, with a Moth Mullein leaf.*

The first sort grows naturally in France, Spain, and Italy; the root is perennial, the stalks are herbaceous, hairy, and trail upon the ground; they are a foot and a half long, sending out branches at the bottom, which are garnished with oblong, oval, hairy, crenated leaves; the upper part of the stalk is furnished with whorls of purple flowers, these stand pretty far asunder. The flowers appear in summer, and the seeds ripen in autumn. It is a plant of no great beauty or use, so is seldom kept in gardens.

The second sort is an annual plant with trailing stalks; the leaves are small, spear-shaped, and sit close to the stalks; the whole plant is hairy. The flowers grow in whorled spikes at the end of the branches, they have prickly empalements and are yellow. It grows in all the southern parts of Europe, and is seldom admitted into gardens.

The third sort grows naturally in the Levant, where it was discovered by the late Dr. Tournefort. The roots of this sort seldom continue longer than two years in England; the lower leaves are oblong, entire, and hairy; the stalks are smooth, hoary, and rise near four feet high, branching out into several long slender branches, and garnished with hoary acute-pointed leaves, furnished with whitish flowers in whorls which are placed far asunder; the whorls are small, compact, and have two very short leaves immediately under them, which end with a sharp spine; the empalements of the flowers are prickly, and the flowers are small. This flowers in July, and the seeds ripen in autumn.

The fourth sort grows naturally in Crete; this is a low shrubby plant, whose stalks rise a foot high, and are ligneous, sending out branches a foot long, which are garnished with narrow spear-shaped leaves an inch and a half long, they are downy and very white; the upper part of the stalk is furnished with whorls of whitish yellow flowers, having prickly empalements. This sort flowers in July, but unless the season proves warm, the seeds will not ripen here.

The fifth sort grows naturally in the south of France and Italy; this hath a perennial root; the stalks rise a foot high, and are garnished with spear-shaped leaves which are deeply crenated on their edges; they are an inch long and half an inch broad, and have short heart-shaped bractea which are prickly. The flowers grow in whorled spikes at the end of the stalks; they are yellow, and have prickly empalements which are equal. It flowers in July, and if the season proves warm, the seeds will ripen in autumn.

The sixth sort grows naturally in Crete; this hath a short ligneous stalk, from which is sent out a few branches about a foot long, garnished with thick wedge-shaped leaves which are very downy and white. The flowers are produced in whorls toward the end of the branches; they are yellow, and have smooth downy empalements. It flowers in July, but does not produce seeds in England.

The seventh sort grows naturally in Spain and Italy; this hath a low shrubby stalk, sending out several hairy branches a foot long, garnished with hairy spear-shaped leaves, one inch long and half an inch broad, of a yellowish green colour. The flowers grow in close

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close whorled spikes at the end of the branches; they are of a sulphur colour, and have very prickly empalements. This sort flowers in July, and the seeds ripen in autumn.

The eighth sort grows naturally on the mountains of Valentia; this hath a short ligneous stalk, sending out branches a foot and a half long, garnished with narrow smooth leaves an inch long, of a strong scent when bruised. The flowers are yellow, and grow in large spiked whorls at the end of the branches. It flowers in June, and the seeds ripen in autumn.

The ninth sort grows naturally in the Canary Islands, but has been long an inhabitant in the English gardens. It rises with a soft shrubby stalk five or six feet high, sending out several ligneous branches which are covered with a soft down, and are garnished with heart-shaped leaves, having long foot-stalks. These differ greatly in size, according to the age and vigour of the plants; for in young plants they are often five or six inches long, and two and a half broad near their base, but in older plants they are not more than half that size; they are very woolly, especially on their under side, which is white, but their upper surface is of a dark yellowish green. The flowers grow in thick whorled spikes at the end of the branches; they are of a dirty white, shaped like those of the other sorts, and appear early in June, and the seeds ripen in August, but the plants frequently produce flowers again in autumn.

These plants are preserved in some curious gardens for the sake of variety. The five sorts first mentioned, and also the ninth, are hardy enough to thrive in the open air in England: they are propagated by seeds, which, if sown in autumn, will succeed better than those which are sown in the spring. The seeds may be sown in shallow drills upon a dry spot of ground, and in the spring when the plants come up, they must be kept clean from weeds; and when the plants are fit to remove, part of each sort may be drawn out, and planted in a bed at about nine or ten inches distance, which will give those which are left in the seed-bed room to grow. The plants which are removed should be shaded and watered until they have taken new root, after which they will require no other care but to keep them clean from weeds till the following autumn, when they should be transplanted to the places where they are to remain. The fourth sort should have a dry soil and a warm situation, but neither of the sorts should be planted in rich ground, for that will cause them to grow so luxuriant in summer, that the frost or much wet will destroy them in winter.

The annual sort should not be removed, but the plants thinned and left in the place where they were sown, keeping them clean from weeds.

The sixth and seventh sorts will often live through the winter in the open air, especially if their seeds are sown upon dry rubbish; for when either of these happen to grow in the joints of old walls, they will endure the greatest cold of this country, therefore their seeds should be sown in such places. The sixth sort does not produce good seeds in England, so this is propagated by slipping off the heads, planting them in a shady border during the spring or summer months, which will readily take root; some of these may then be taken up and put into pots, that they may be screened under a frame in winter. The other may be removed in autumn, and planted close to warm walls in rubbish, where they will abide some years.

The ninth sort is generally kept in green-houses in England, but in moderate winters I have had these plants live abroad without cover in a warm dry border: however, if they are screened from hard frost under a common frame, where they may be exposed to the open air at all times when the weather is mild, and protected from hard frosts, they will thrive better than with more tender treatment. It is propagated by seeds which should be sown in autumn,

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for those which are sown in the spring seldom succeed, or if they do, the plants rarely come up the first year.

SIDEROXYLUM, Iron Wood.

The CHARACTERS are,

The empalement of the flower is permanent and consists of one leaf, which is cut into five segments. The flower is bell-shaped, and divided into five parts at the brim. It has five awl-shaped stamina the length of the petal, terminated by single summits, and a round germen supporting an awl-shaped style, crowned by a single stigma. The germen afterward becomes a roundish berry having one cell, containing four seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. SIDEROXYLUM (*Inerme*) inerme. Lin. Hort. Cliff. 69. *Smooth Iron Wood.* Sideroxylum primum, sc. deincoriæ Indorum nomine data arbor. Hort. Elth. 357. *The first Iron Wood, called by the Indians Dein Coria.*
2. SIDEROXYLUM (*Oppositifolia*) foliis lanceolatis ex adverso fitis. *Iron Wood with spear-shaped leaves growing opposite.*

These plants grow naturally at the Cape of Good Hope, from whence they were first brought into the Dutch gardens, and of late years they have been introduced into several curious gardens in England, where they are preserved for the beauty of their evergreen leaves, for they rarely produce flowers here.

The first sort hath large oval leaves, shaped somewhat like those of the Bay-tree, but smoother and blunter at the end. These are placed on the branches without order, as the branches also are produced. The stalks are shrubby, and rise five or six feet high, sending out many branches, covered with a dark brown bark.

The second sort grows more upright and regular; the leaves which are smaller, and more pointed than those of the first, are placed opposite on the branches, and these continue green through the year.

The wood of these trees being very close and solid, has given occasion for this name being applied to them, it being so heavy as to sink in water; and the title of Iron Wood having been applied to the wood, by the inhabitants of the countries where it grows, has occasioned the botanists to constitute a genus by this name. But as the characters of the plants have not been so well examined as could be wished, occasioned by their not flowering in Europe, it is very probable, that the plants which have been ranged under this genus, do not properly belong to it; for Dr. Plukenet has figured a plant under the title of Ebenus Jamaicensis, whose characters are very different from those assigned to this genus: and the Jamaica Iron Wood is totally different from both in its characters, for this has male and female flowers on different trees; the male flowers have no petals, as appears by dried samples in my collection.

These plants are natives of warm countries, so cannot be preserved in England, unless they are placed in a moderate stove. They are propagated by seeds, when these can be procured from abroad. These must be sown in pots filled with light rich earth, and plunged into a good hot-bed in the spring, in order to get the plants forward early in the season. When the plants are fit to transplant, they should be each put into a separate small pot filled with good earth, and plunged into a fresh hot-bed while they are young. In winter they must be plunged into the tan-bed in the stove, and treated in the same manner as hath been directed for several tender plants from the same countries. As the plants obtain strength, they may be treated more hardily, by placing them in a dry stove in the winter, and giving them a greater share of free air in summer; and when they have obtained strength, they may be placed abroad in summer in a sheltered situation.

I have propagated them by layers, but these were two years before they had made good roots; and some-

sometimes they will take from cuttings, but this is a very uncertain method of propagating them; nor do the plants so raised, ever grow so vigorously as those which come from seeds; so that when those can be procured, it is the best method to propagate them.

SIGESBECKIA. Lin. Sp. Plant. 873.

The CHARACTERS are,

The proper involucre of the flower is composed of five linear, taper, obtuse leaves, which open beyond the petal, and is permanent. The common cover is five-leaved, sitting close; it has five angles; the leaves are oval, concave, equal, and disposed in several series; it is permanent, and between each leaf is contained a floret. The flower is composed of hermaphrodite florets in the disk, and the border or ray is made up of female half florets, which are tongue-shaped. The hermaphrodite florets are funnel-shaped, and cut into five parts at the brim; these have five short stamina, with tubulous summits joined together, and an oblong incurved germen as large as the empalement, supporting a slender style, crowned by a bifid stigma. The germen afterward turns to an oblong, four-cornered, blunt seed; the female half florets have a short, broad, tongue-shaped petal, indented in three parts; these have a germen, style, and stigma, like the hermaphrodite florets, but have no stamina, and are succeeded by single seeds like the other.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which includes the plants whose flowers are composed of hermaphrodite and female florets which are both fruitful, and have their parts of generation connected together.

We have but one SPECIES of this genus, viz.

SIGESBECKIA (*Orientalis*.) Lin. Hort. Cliff. Sigesbeckia.

We have no English name for this plant; this here mentioned was applied to it by Dr. Linnæus, in honour of Dr. Sigesbeck, who was professor of botany at Petersburg.

The plant is annual, perishing at the approach of winter. The seeds of it were brought from the East-Indies, where it is a troublesome weed, but in England it seldom perfects seeds, unless the plants are raised on a hot-bed, and brought forward in the spring; then they may be planted out in warm borders the beginning of June, and if they are supplied with water in dry weather, they will grow near four feet high, and send out many branches. The flowers are produced at the extremity of the shoots, which are small, and of a yellow colour, so make no great appearance, therefore it is only preserved in the gardens of those persons who are curious in the study of plants.

SILAUM. See PEUCEDANUM.

SILENE. Lin. Gen. Plant. 503. Viscago. Dill. Hort. Elth. 309. Lychnis. Tourn. Inst. R. H. 333. tab. 175. Viscous Champion, or Lychnis.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, which is indented at the top into five parts. It has five plain obtuse petals indented at their points, whose tails are narrow the length of the empalement, and a nectarium compounded of two small indentures in the neck of each petal, constituting a crown to the chaps, and ten awl-shaped stamina, inserted alternately to the tail of the petals above each other, terminated by oblong summits. In the center is situated a cylindrical germen, supporting three styles which are longer than the stamina, crowned by stigmas that are reflexed against the sun. The germen afterward becomes a close cylindrical capsule with three cells, opening at the top five ways, inclosing many kidney-shaped seeds.

This genus of plants is ranged in the third section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and three styles.

The SPECIES are,

1. SILENE (*Quinquevulnera*) petalis integerrimis subrotundis, fructibus erectis alternis. Hort. Cliff. 171. Silene with entire roundish petals to the flower, and erect alternate fruit. Lychnis hirsuta, flore eleganter variegato. Raii Hist. 997. Hairy Champion with an elegant variegated flower, commonly called Dwarf Lychnis.
2. SILENE (*Nocturna*) floribus spicatis alternis secundis

seffilibus, petalis bifidis. Lin. Sp. Plant. 416. Silene with spikes of flowers sitting close and turned all one way, and the petals bifid. Viscago hirta noctiflora, floribus obsoletis spicatis. Dillen. Hort. Elth. 420. Night-flowering, hairy, viscous Champion, with worn-out flowers in spikes.

3. SILENE (*Nutans*) petalis bifidis, floribus lateralibus secundis cernuis panicula nutante. Lin. Sp. Plant. 417. Silene with bifid petals, nodding flowers growing from the side of the stalks, and a recurved panicle. Lychnis montana, viscosa, alba, latifolia. C. B. P. 205. Broad-leaved, white, viscous, Mountain Champion.
4. SILENE (*Fruticosa*) petalis bifidis, caule fruticoso, foliis lato lanceolatis, panicula trichotoma. Lin. Sp. Plant. 417. Silene with bifid petals, a shrubby stalk, broad spear-shaped leaves, and panicles divided in threes. Lychnis frutescens, myrtifolia, behen albo similis. C. B. P. 205. Shrubby Champion, with a Myrtle leaf like the white Behen.
5. SILENE (*Viridiflora*) petalis femibifidis, foliis ovatis scabriusculis acutis, panicula elongata subaphylla. Lin. Sp. 597. Silene with bifid petals, oval, rough, acute-pointed leaves, and long panicles without leaves. Lychnis ocymasti facie, flore viridi. Herm. Par. 199. Champion with the appearance of Ocymastrum, and a green flower.
6. SILENE (*Conoidea*) calycibus fructus globosis acuminatis striis triginta, foliis glabris petalis integris. Hort. Upsal. 110. Silene with globular acute-pointed capsules having thirty stripes, smooth leaves, and entire petals. Lychnis sylvestris, latifolia caliculis turgidis striatis. C. B. P. 205. Broad-leaved wild Champion, with a turgid striped empalement.
7. SILENE (*Pendula*) calycibus fructiferis pendulis inflatis, angulis decem scabris. Hort. Upsal. 106. Silene with pendulous swollen empalements to the fruit, with ten rough angles. Lychnis supina Sicula, calyce amplissimo striato. Tourn. Inst. R. H. 337. Low Sicilian Champion, with a large striped empalement.
8. SILENE (*Noctiflora*) calycibus decem angularibus, dentibus tubum æquantibus caule dichotomo. Lin. Sp. Plant. 419. Silene with empalements having ten angles, and the indentures as long as the tube. Lychnis noctiflora. C. B. P. 205. Night-flowering Champion.
9. SILENE (*Vallesia*) caulibus subunifloris decumbentibus, foliis lanceolatis longitudine calycis. Lin. Sp. 603. Silene with decumbent stalks with one flower, and spear-shaped woolly leaves the length of the empalement. Lychnis maritima pinguis e Corfica. Bocc. Mus. tab. 84. Maritime Lychnis of Corfica.
10. SILENE (*Orientalis*) calycibus conicis striis hirsutis fructibus erectioribus, caule erecto hirsuto, foliis nervosis. Silene with conical empalements having hairy stripes, erect fruit, a hairy upright stalk, and veined leaves. Lychnis Orientalis, longifolia nervosa, flore purpurascens. Tourn. Cor. 24. Eastern Champion with a long veined leaf and a purplish flower.
11. SILENE (*Muscipula*) petalis bifidis, caule dichotomo, floribus axillaribus seffilibus, foliis glabris. Lin. Sp. Plant. 420. Silene with bifid petals, a stalk divided by pairs, flowers sitting close to the wings of the stalk, and smooth leaves. Lychnis sylvestris viscosa, rubra altera. C. B. P. 205. Wild viscous Champion with a red flower.
12. SILENE (*Armeria*) floribus fasciculatis fastigiatis, foliis superioribus cordatis glabris. Hort. Upsal. 110. Silene with flowers gathered into bunches, whose upper leaves are smooth and heart-shaped. Lychnis viscosa purpurea, latifolia lævis. C. B. P. 205. Purple viscous Champion with a broad smooth leaf, commonly called Lobel's Catchfly.
13. SILENE (*Gigantea*) foliis radicalibus cochleariformibus firmis caule subverticillato. Lin. Sp. 598. Silene with obtuse, spoon-shaped, lower leaves, and whorled stalks. Lychnis facie auriculæ urfi. C. B. P. 206. Champion with the appearance of Auricula.
14. SILENE (*Bupleuroides*) petalis bifidis, floribus pendunculatis oppositis bractea brevioribus, foliis lanceolatis acutis glabris. Lin. Sp. 598. Silene with bifid petals, flowers placed opposite on foot-stalks, and smooth

acute leaves. *Lychnis Orientalis bupleuri folio.* Tourn. Cor. 24. *Eastern Campion with a Hare's-ear leaf.*

There are several other species of this genus whose flowers have no beauty, so the plants are never cultivated but in botanic gardens for the sake of variety, therefore I have not enumerated them, which would swell the work too much; many of them grow wild in England.

The first sort grows naturally in Portugal, but has been long cultivated in the English gardens by the title of Dwarf *Lychnis*. The seeds of this were formerly sown in drills on the edges of borders, as were several other low annual plants, these being very fashionable for edgings of borders at that time; but as all these were of short duration, so they soon were rejected for this purpose; after which the seeds were usually sown in patches in the borders, where they made a better appearance than in the former way: but in both these methods the plants were generally left so close as to spoil their growth, for their stalks were drawn up very weak, and had not room to branch out, and their flowers were small; therefore those who are desirous to have this plant in beauty, should sow the seeds thin upon a border of light earth in autumn, and in the spring the plants should be thinned to the distance of four inches, and keep them afterward clean from weeds. When they are so managed, the plants will rise near a foot and a half high, with hairy channelled stalks, and divide into many branches, garnished with oval, spear-shaped, hairy leaves placed opposite, sitting close to the stalks. The flowers grow in short spikes at the end of the branches; they are placed alternately, and are of a bright purple colour, edged with white. The autumnal plants will flower in May and June, but those which are sown in the spring, will come a month later.

The second sort grows naturally in Sicily, and also at the Cape of Good Hope, from whence I have received the seeds. This is an annual plant, with a low branching stalk, which seldom rises more than eight or nine inches high; the stalks are smooth, the leaves are very narrow and smooth, placed by pairs; the stalks are terminated by spikes of dark purple flowers standing alternate, whose petals are bifid; they open in the evening, but are closely shut in the day. If the seeds of this plant are sown in autumn, upon a warm border, the plants will flower in May and June, so good seeds may be obtained; but when the seeds are sown in the spring, they often fail; and if any of the plants do come up, they are generally so late as that their seeds seldom ripen well.

The third sort is a perennial plant which grows naturally on the Alps; the lower leaves of this are smooth and spear-shaped, the stalk rises near two feet high, and is garnished with two narrow leaves placed opposite at each joint, and immediately below them; the stalk is very clammy; the flowers come out on short foot-stalks from the wings of the leaves, each foot-stalk for the most part sustaining three flowers, with long, white, bifid petals. These appear in June, and the seeds ripen in August. This plant rises easily from seeds if they are sown in autumn, and the only culture the plants require is to keep them clean from weeds, and allow them room to spread; they love a cool soil and a shady situation.

The fourth sort grows naturally in Sicily; this has a low shrubby stalk, which divides into several short shrubby branches, garnished with broad, smooth, spear-shaped leaves, ending in acute points. The flower-stalks rise about a foot high, and divide into spreading panicles, sustaining two and three flowers, of an herbaceous white colour; they appear in June and July, and are succeeded by oval smooth capsules having thick covers, filled with small seeds which ripen in autumn. This sort rises easily from seeds as the former, or may be propagated by slips, which, if planted in a shady border will take root very freely; and if the plants are planted in a warm border of dry earth, they will live several years and require no

shelter, but in moist ground they frequently rot in winter.

The fifth sort grows naturally in Portugal; this has a perennial root; the lower leaves are roundish and hollowed like a spoon; those upon the stalks are obtuse, and stand sometimes by pairs, at others by threes or fours round the stalks; they are of a deep green, smooth, and sit close to the stalks; the stalks are round, smooth, and rise from two to three feet high. The flowers grow in loose spikes at the top; they are of a green colour, and appear in June, and the seeds ripen in August. This rises easily from seeds sown in autumn, and if the plants have a dry soil they will continue several years, and require no other culture but to keep them clean from weeds.

The sixth sort grows naturally among Corn in France, Spain, and Italy. It is an annual plant, with an upright branching stalk a foot and a half high, having swelling viscous joints, garnished with narrow, acute-pointed, smooth leaves, near three inches long, sitting close to the stalks. The flowers are produced at the end of the branches, they are small and red; these are succeeded by globular capsules ending in acute points, whose empalements are striped. It flowers in June, and the seeds ripen in August. The seeds of this should be sown in autumn, and in the spring the plants should be thinned and kept clean from weeds, which is all the culture they require.

The seventh sort grows naturally in Sicily and Crete; this is an annual plant, from whose root comes out several branching stalks near a foot and a half long, which trail upon the ground, and are garnished with oval acute-pointed leaves placed opposite. The flowers come out singly from the wings of the stalk, upon short foot-stalks; they are large, and of a bright red colour, resembling those of the common, wild, red Campion. These appear in May, and are succeeded by large capsules included in inflated empalements, having ten rough angles, containing many large roundish seeds, whose weight causes the capsules to hang downward. If the seeds of this are permitted to scatter, the plants will come up without care, and require nothing more but to keep them clean from weeds.

The eighth sort is an annual plant, which is found naturally in England growing among Corn. It rises with a thick clammy stalk eight or nine inches high, garnished with small oblong leaves by pairs, whose base embrace the stalks; the top of the stalk sustains one or two small red flowers, which open only in the night. This flowers in June, and the seeds ripen early in August, which, if permitted to scatter, the plants will come up without farther trouble.

The ninth sort grows naturally upon the Alps; this plant seldom rises more than six inches high, sending out many shrubby decumbent branches, garnished with woolly spear-shaped leaves; the flowers grow erect, they are of a pale red colour, and are succeeded by turgid capsules filled with roundish seeds.

This is propagated by seeds, which if sown in dry rubbish, the plants will live many years in the open air, but in rich moist soils they rarely live through the winter.

The tenth sort grows naturally in the Levant; this is an annual plant, with a strong, erect, hairy, branching stalk, which rises two feet high. The branches grow erect, as do also the flowers, which are red, and have large, conical, striped empalements, whose stripes are hairy and of a brownish colour. The flowers appear in June, and the seeds ripen in August; this must be treated in the same way as the first sort.

The eleventh sort grows naturally in the south of France, Spain, and Italy; this is biennial. The stalk is round, clammy, and rises a foot and a half high, having swelling joints; the leaves grow round the stalks in clusters; they are very narrow and smooth. The upper part of the stalk divides into spreading branches by pairs, and are adorned by red flowers coming out singly from the wings of the leaves, sitting

zing close to the stalks. These appear in May, and are succeeded by oblong viscous capsules filled with angular seeds, which ripen in July.

This sort is easily propagated by seeds, which, if sown in autumn, will succeed much better than in the spring. When the plants come up and are fit to remove, they should be transplanted into a bed of fresh earth, at six inches distance, shading them from the sun, and watering them until they have taken new root; after which they must be kept clean from weeds till autumn, when they should be transplanted to the places where they are designed to remain for flowering. When the seeds of this plant happen to scatter upon a wall, and plants arise there, they will continue much longer than in the ground.

The twelfth sort is an annual plant, which grows naturally in the south of France and Italy; but has been many years cultivated in the English gardens, from whence the seeds have spread out upon walls and buildings so far, as to induce some to believe it a native of England.

There are three varieties of this, which generally retain their differences; one has a bright purple flower, the other a pale red, and the third a white flower; these do not differ in any other respect, so cannot be reckoned as different species.

The stalks grow erect a foot and a half high; the lower leaves are broad, oblong, and smooth, and sit close to the stalks; the stalk, for more than an inch in length below each stalk is so glutinous, that the small flies which light thereon are fastened and cannot get off again, from whence it had the title of Catch-fly. The flowers grow in bunches at the top of the stalk; they stand erect, forming a kind of umbel. These appear in June, and are succeeded by slender oblong capsules, filled with angular seeds which ripen in August.

These seeds should be sown in autumn, for those which are sown in the spring often fail; and if the plants do come up, they never grow so large, or make so good appearance as the autumnal plants.

The thirteenth sort is biennial; this grows naturally in Sicily and Crete; the lower leaves of this plant are obtuse, and are gathered in circular heads like some of the Houseleeks, or those of the Auricula; they are smooth, and of a pretty thick consistence. The stalks rise five or six feet high; they are viscous, and are garnished with spear-shaped leaves placed opposite. The flowers come out upon short foot-stalks from the wings of the stalks in whorls, each foot-stalk sustaining three or four greenish flowers; these are succeeded by oval capsules which spread open at the top, and are filled with angular seeds.

If the seeds of this plant are sown in autumn upon a warm border, they will more certainly succeed than those sown in the spring. When the plants come up and are fit to remove, they should be planted on a dry soil and in a warm situation, where they will live through the winter, and the following summer they will flower and ripen their seeds, and then decay.

The fourteenth sort grows naturally in the Levant; this has a perennial root; the lower leaves are narrow, spear-shaped, and smooth; they are gathered in clustered heads, from the middle of which rises an erect clammy stalk a foot and a half high, garnished with very narrow leaves. The flowers come out from the wings of the leaves toward the top of the stalk; their foot-stalks are short, and each sustains two white flowers having long tubes, standing erect; the flowers are closed in the day, and expand at night. This flowers in July, but rarely produces ripe seeds in England.

As the seeds seldom ripen here, so it is difficult to propagate it: the only way is to slip off the heads in June, and plant them under a glass; these will take root, if they are shaded from the sun and duly watered.

SILER. See LASERPITIUM.

SILQUA. See CERATONIA.

SILQUASTRUM. See CERCIS.

SILICUOUS, are plants whose seeds are in a husk, pod, or shell.

SILPHIUM. Lin. Gen. Plant. 882. Chrysanthemum. Mor. Hist. 3. Bastard Chrysanthemum.

The CHARACTERS are,

The common empalement of the flower is oval, imbricated, and permanent; the scales are oval, prominent, and reflexed in the middle. The disk of the flower is composed of hermaphrodite florets which are tubulous, of one leaf, indented in five parts at the top. These have five short hair-like stamina, terminated by cylindrical summits, and a slender taper germen supporting a long hairy style, crowned by a single stigma; these are barren. The rays of the flower are composed of a few female half florets, which are long, spear-shaped, and for the most part have three indentures at their points; these have a heart-shaped germen with a short single style, having two bristly stigmas of the same length. These are succeeded by single heart-shaped seeds with a membranaceous border, indented at the top, each point ending with a horn or tooth, and are separated by linear chaff, ripening in the empalement. This genus of plants is ranged in the fourth section of Linnæus's nineteenth class, which includes those plants whose flowers have their male and female parts connected, and their hermaphrodite flowers are barren, but the female are fruitful.

The SPECIES are,

1. SILPHIUM (*Trifoliatum*) foliis ternis. Roy. Prod. Leyd. 181. *Silphium with leaves by threes at a joint. Chrysanthemum Virginianum, foliis asperis tribus vel quaternis ad genicula fitis. Mor. Hist. 3. p. 24. Virginian Corn Marygold, with rough leaves placed by threes or fours at a joint.*
2. SILPHIUM (*Asteriscus*) foliis indivisis sessilibus oppositis inferioribus alternis. Lin. Sp. Plant. 920. *Silphium with undivided leaves set opposite close to the stalks, whose lower leaves are alternate. Asteriscus coronæ solis folio & facie. Hort. Elth. 42. Asteriscus with the leaf and appearance of Sunflower.*
3. SILPHIUM (*Solidaginoides*) foliis oppositis lanceolatis petiolatis acute serratis. Lin. Sp. 1302. *Silphium with spear-shaped sawed leaves having foot-stalks. Chrysanthemum Marianum virgæ aureæ Americanæ foliis, florum petalis tridentatis. Pluk. Mant. 46. Maryland Corn Marygold, with an American Golden Rod leaf, and the petals of the flower indented in three parts.*
4. SILPHIUM (*Arborefcens*) foliis lanceolatis alternis scabris, obsolete serratis caule fruticoso. *Silphium with rough spear-shaped leaves placed alternate, which have slight sawed edges, and a shrubby stalk. Corona solis Americana arborefcens, flore parvo luteo, semine alato. Houft. MSS. Tree American Sunflower, with a small yellow flower and a winged seed.*

The first sort grows naturally in many parts of North America; the root is perennial and ligneous, the stalks are annual; these rise five feet high or more in good land, they are of a purplish colour, and branch toward the top. The leaves are oblong, rough, and have some sharp teeth on their edges; they are from three to four inches long, and almost two broad; toward the bottom of the stalk they stand by fours round it at each joint; higher up they are by threes, and at the top by pairs, sitting close to the stalks. The flowers stand upon pretty long foot-stalks, each sustaining one flower, whose empalement is composed of three orders of leaves placed imbricatum, like the scales of fish, the outer order being the smallest. The ray or border of the flower is composed of thirteen female half florets, which are yellow, tongue-shaped, and indented in three points at the end. The disk or middle of the flower is made up of hermaphrodite tubulous flowers, which are slightly cut into five parts at the top; these have five stamina and a style connected together, which are longer than the tube of the floret. This plant flowers in July and August, and when the autumn proves warm, it will produce ripe seeds.

It is propagated by parting of the roots, in the same way as is practised for the perennial Sun-flowers; the best time for this is in autumn, when their stalks be-

gin to decay, and the plants may afterward be treated in the same way as the perennial Sun-flower.

The second sort grows naturally in Carolina; the root of this is perennial; the stalk is thick, solid, and set with prickly hairs; it rises four or five feet high, and has many purple spots; the leaves on the lower part of the stalk are placed alternate, but upward they are opposite, and sit close to the stalk; they are rough, about two inches long, and one broad near their base, having a few slight indentures on their edges. The upper part of the stalk divides into five or six small branches, which are terminated by yellow radiated flowers like those of the perennial Sun-flower, but smaller, having generally nine female half florets which compose the border or ray; the other parts are like those of the former sort. It flowers in August, but the seeds do not ripen in England. This sort is propagated by parting the roots in the same way as the former, but as this is not quite so hardy, it should be planted in a sheltered situation.

The third sort grows naturally in many parts of North America; this is a perennial plant, whose stalks rise near three feet, and are garnished with oblong sawed leaves placed by pairs upon short foot-stalks. The flowers are loosely disposed at the top of the stalks; they are yellow, and have their half florets which compose the ray, indented in three parts at the end. This plant flowers in August, but the seeds do not ripen here. It may be propagated in the same way as the former, and the plants require the same treatment.

The fourth sort was discovered by the late Dr. William Houstoun, growing naturally at La Vera Cruz in New Spain. This rises with a shrubby stalk to the height of eight or ten feet, sending out ligneous branches, which are garnished with spear-shaped leaves placed alternately on every part of the stalk; they are four inches long, and one and a half broad in the middle, ending in acute points; their surface is rough, and their edges slightly sawed. The flowers are produced at the end of the branches, some singly on slender foot-stalks, others are by two or three upon each foot-stalk; they are unequal in height, and have short scaly empalements. The florets are short which compose the ray, and those of the disk are more prominent than those of the other sorts. They are of a deep yellow colour, but are not succeeded by seeds in England.

This sort is with difficulty propagated here, for unless the seeds are procured from the country where the plants grow naturally, they cannot be obtained that way, and the cuttings are not apt to take root. The only method of getting them to grow, is to slip off the young shoots in July, and plant them in a pot filled with soft loam, and plunge the pot into a gentle hot-bed, covering the pot closely with a bell or hand-glass, and shade them from the sun. When the cuttings are rooted, they should be each planted in a separate pot, filled with light loamy earth; and during the warm months, they may be placed in the open air in a warm situation, but in winter they should be kept in a moderate stove.

SINAPIS. Lin. Gen. Plant. 735. Sinapi. Tourn. Inst. R. H. 227. tab. 112. [σίνηπι, of σίνειν ὀφθαλμῶς, because it forces tears from the eyes of those that use it incautiously, makes the nose red, and the eyes swell.] Mustard; in French, *Moutarde*.

The CHARACTERS are,

The empalement of the flower is composed of four narrow leaves placed in form of a cross, which spread open and fall off. The flower has four roundish petals in form of a cross, and four oval nectariums, one on each side of the short stamina and the pointal, and one on each side of the longer stamina and the empalement. It has six awl-shaped erect stamina, two of which are opposite and as long as the empalement, the other four are longer. In the center is placed a taper germen, with a style the length of the germen, crowned by a beaded stigma. The germen afterward turns to an oblong pod, which is very rough at bottom, having two cells opening with two valves, whose intermediate par-

tion is large, compressed, and almost twice the length of the valves, and the seeds are globular.

This genus of plants is ranged in the second section of Linnæus's fifteenth class, which includes those plants whose flowers have four long and two shorter stamina, and the seeds are included in long pods.

The SPECIES are,

1. SINAPIS (*Alba*) filiquis hispidis, rostro obliquo longissimo. Hort. Cliff. 338. *Mustard with prickly pods, and a very long oblique beak.* Sinapi apii folio. C. B. P. 96. *Mustard with a Smallage leaf, commonly called white Mustard.*
2. SINAPIS (*Nigra*) filiquis glabris apice tetragonis. Hort. Cliff. 338. *Mustard with a smooth four-cornered pod.* Sinapi rapi folio. C. B. P. 99. *Mustard with a Rape leaf, or common Mustard.*
3. SINAPI (*Arvensis*) filiquis multangulis toroso-turgidis, rostro longioribus. Hort. Cliff. 338. *Mustard with many-angled, rough, swelling pods, having a longer beak.* Sinapi arvense præcox, semine nigro, foliis integris. Tourn. Inst. 226. *Early Field Mustard, with a black seed and entire leaves.*
4. SINAPIS (*Erucoïdes*) filiquis lævibus æqualibus, foliis lyratis oblongis glabris, caule scabro. Amœn. Acad. 4. p. 322. *Mustard with smooth equal pods, lyre-shaped, oblong, smooth leaves, and rough branches.* Sinapi Hispanicum, pumilum album. Tourn. Inst. 227. *Low white Spanish Mustard.*
5. SINAPIS (*Juncea*) ramis fasciculatis, foliis summis lanceolatis integerrimis. Hort. Upsal. 191. *Mustard with bundled branches, and the upper leaves spear-shaped and entire.* Sinapi Indicum maximum, lactucæ folio. Par. Bat. 230. *Greatest Indian Mustard with a Lettuce leaf.*
6. SINAPIS (*Hispanica*) foliis duplicato-pinnatis, laciniis linearibus. Hort. Cliff. 338. *Mustard with doubly-winged leaves having linear segments.* Sinapi Hispanicum nasturtii folio. Tourn. Inst. 227. *Spanish Mustard with a Cress leaf.*

The first sort is the common white Mustard, which is generally cultivated as a salad herb for winter and spring use. This rises with a branched hairy stalk two feet high, the leaves are deeply jagged on their edges and are rough. The flowers are disposed in loose spikes at the end of the branches, standing upon horizontal foot-stalks; they have four yellow petals placed in form of a cross, which are succeeded by hairy pods that end with long, compressed, oblique beaks; the pods generally contain four white seeds. It flowers in June, and the seeds ripen in August.

The second sort is the common Mustard, which is frequently found growing naturally in many parts of England, but is also cultivated in fields for the seed, of which the sauce called Mustard is made. This rises with a branching stalk four or five feet high; the lower leaves are large, rough, and very like those of Turnep, the upper leaves are smaller and less jagged. The flowers are small, yellow, and grow in spiked clusters at the end of the branches; they have four petals placed in form of a cross, these are succeeded by smooth pods ending with four corners. It flowers and seeds at the same time with the former.

The third sort grows naturally on arable land in many parts of England. The seed of this is commonly sold under the title of Durham Mustard-seed; of this there are two varieties, if not distinct species; one with cut, and the other has entire leaves. The stalks rise about two feet high, the leaves are rough, and in one they are jagged like Turnep leaves, and in the others are oblong and entire. The flowers are yellow, the pods are turgid, angular, and have long beaks. These flower in April and May, and the seeds ripen in June.

The fourth sort grows naturally in Spain; this seldom rises more than eight or nine inches high; the leaves are smooth and much jagged, the stalk branches toward the top, and is terminated by a loose spike of white flowers; these are succeeded by smooth, taper, blunt pods, filled with small brown seeds. It flowers in June, and the seeds ripen in August.

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The fifth sort grows naturally in China, from whence the seeds are frequently brought to England. This plant is used as a boiled sallad by the Chinese, where it may prove acceptable to those who have not better herbs for that purpose, but in England it is not regarded. The stalks of this rise three or four feet high, and toward the bottom are garnished with broad, smooth, jagged leaves, but those on the top are entire. The flowers are yellow like those of the first sort, and the pods are smooth and turgid. It flowers in June, and the seeds ripen in August.

The first sort is chiefly cultivated in gardens, for a sallad herb in the winter season. The seeds of this are commonly sown very thick in drills, either upon a warm border, or in very cold weather upon a moderate hot-bed, with Cressies and other small sallad herbs, which are commonly fit for use in ten days or a fortnight after the time of sowing; for if they are large and have rough leaves, they are too strong to put into sallads. In order to save the seeds of this plant, a spot of ground must be sown with it in the spring, and when the plants have four leaves, the ground should be hoed in the same manner as for Turneps, to cut down the weeds, and thin the plants where they are too close; this should be done in dry weather, for then the weeds will soon die after they are cut. If this is well performed, the ground will remain clean for a month, by which time young weeds will spring up again; therefore the ground should be again hoed over, and the plants now left about eight or nine inches asunder, which will be sufficient room for this sort to grow. If this is well performed, and in dry weather, the ground will remain clean till the seeds are ripe. As soon as the pods change brown, the plants should be cut off and spread upon cloths two or three days to dry, and threshed out for use.

The second sort is cultivated only for the seeds; these should be sown in the same way as those of the first, and the plants treated in the same manner, with this difference of allowing the plants twice as much room, because they grow much larger, so these should be hoed out to the distance of eighteen inches; and as the seeds will not ripen so soon as the other, so the ground may be required to be hoed three times over, but that may be easily seen by the growth of the weeds.

The seeds of these two first species are ordered for medicinal use.

The third sort is a pretty common weed on arable lands in most parts of England; this comes up early in the spring amongst the Corn, so flowers and seeds in May; therefore where it is not weeded out, the seeds will scatter long before the Corn is ripe, and the ground will be stocked with the weeds.

The other three sorts are preserved in botanic gardens for variety, but are never cultivated for use; these may be treated in the same way as the two first species.

SINAPISTRUM. See CLEOME.

SISARUM. See SIUM.

SISON. Lin. Gen. Plant. 311. Sii species. Tourn. Inst. R. H. 301. Bastard Stone Parsley; in French, *Berle*.

The CHARACTERS are,

It hath an umbellated flower; the general umbel is composed of six thin rays or small umbels, which are unequal, as are also the smaller, which have ten. The involucri of both are four-leaved and unequal; the empalement of the flower is scarce discernible. The outer petals of the general umbel are uniform; the flowers have five equal petals which are spear-shaped and inflexed. They have five hair-like stamina the length of the petals, terminated by single summits. The oval germen is situated under the flower, supporting two reflexed styles crowned by obtuse stigmas. The germen afterward becomes an oval streaked fruit dividing in two parts, each containing one oval streaked seed, convex on one side and plain on the other.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. SISON (*Amomum*) foliis pinnatis, umbellis erectis. Prod. Leyd. 105. *Sison with winged leaves and erect umbels.* Sium aromaticum, sison officinarum. Tourn. Inst. R. H. 308. *Bastard Stone Parsley, or spurious Amomum.*
2. SISON (*Segetum*) foliis pinnatis, umbellis cernuis. Prod. Leyd. 105. *Sison with winged leaves and nodding umbels.* Sium arvense, five segetum. Tourn. Inst. 308. *Honewort or Corn Parsley.*
3. SISON (*Canadense*) foliis ternatis. Hort. Cliff. 99. *Sison with trifoliate leaves.* Myrrhis Canadensis trilobata. Mor. Hist. 3. p. 301. *Canada Myrrh with trilobate leaves.*
4. SISON (*Verticillatum*) foliolis verticillatis capillaribus. Lin. Sp. Plant. 253. *Sison with hair-like small leaves in whorls.* Carui foliis tenuissimis aphodeli radice. Tourn. Inst. 306. *Narrow-leaved Carraway with an Aphodel root.*

The first sort grows on the side of ditches and moist shady banks in many parts of England; it is a biennial plant, which perishes soon after the seeds are ripe. The root is taper, running deep into the ground; the lower leaves are winged; they are composed of four pair of lobes terminated by an odd one; these are an inch and a half long, and half an inch broad, regularly indented on both sides, and the indentures are sawed; they are of a lucid green, and have an aromatic odour. The stalks rise three feet high, and branch out on every side; these are garnished with leaves of the same form with those below, but smaller; at the end of the branches the flowers are produced in small umbels. The flowers are white; they appear in June, and are succeeded by striated seeds, of a hot, pleasant, aromatic smell and taste, which ripen in August.

This plant is found growing so plentifully wild, as that it is rarely kept in gardens; but whoever is willing to propagate it, should sow the seeds in autumn, in a moist shady spot of ground, where the plants will come up, and require no farther care than to keep them clean from weeds; and if the seeds are permitted to scatter, the plants will rise without care. The seeds of this plant is put into Venice treacle, for a succedaneum to the true Amomum.

The second grows naturally among Corn on moist land, in several parts of England. This is also a biennial plant, which decays soon after the seeds are ripe; it rises with an upright stalk about a foot high, which rarely divides into branches; the leaves stand upon pretty long foot-stalks; they are winged, but the lobes are smaller and finer cut than those of the former; the umbels of flowers are more compact, and nod on one side. It flowers and seeds about the same time as the former, and the plant may be cultivated in the same way.

The third sort grows naturally in North America, but is preserved by those who are curious in botany in their gardens. This has a perennial root; the stalk rises a foot and a half high, and is garnished with trifoliate leaves, whose lobes are oval, spear-shaped, and sawed on their edges; they are about three inches long, and one and a half broad; their foot-stalks are set with bristly hairs, and their base inclosed by a membranaceous sheath, which half embraces the stalk. The flowers are in umbels which terminate the stalks, and there are small ones which come from the wings of the stalk; they are very irregular in their form. The flowers are white, appear in June, and are succeeded by oblong streaked seeds which ripen in August.

The fourth sort grows naturally on the Alps and Apennines; this rises with a swelling jointed stalk near two feet high, which is garnished with very fine slender leaves, standing in whorls like those of the Water Milfoil; it branches out toward the top, each branch being terminated by a pretty large umbel of flowers, which are purplish on their outside, but white within; these appear the latter end of May, and the seeds ripen

the end of July. The roots of this plant are composed of thick fleshy knots somewhat like those of the King's Spear.

These two last mentioned sorts may be cultivated by seeds, which should be sown in autumn, for those which are sown in the spring seldom grow the first year. The plants require no other culture than to thin them where they are too close, and keep them clean from weeds; they both delight in a moist soil and a shady situation, where the roots will continue several years.

SISYMBRIUM. Tourn. Inst. R. H. 225. tab. 109. Lin. Gen. Plant. 728. Water Cresses.

The CHARACTERS are,

The flower has a spreading empalement composed of four linear, spear-shaped, coloured leaves, which fall off; it has four oblong spreading petals placed in form of a cross, and six stamina, four of which are longer than the empalement, the other two, which are opposite, are shorter, and terminated by single summits; it has an oblong slender germen with scarce any style, crowned by an obtuse stigma. The germen afterward becomes a taper, oblong, incurved pod having two cells, opening with two valves which are shorter than the intermediate partition, and filled with small seeds.

This genus of plants is ranged in the second section of Linnæus's fifteenth class, which contains those plants whose flowers have four long and two shorter stamina, and the seeds are included in pods.

The SPECIES are,

1. SISYMBRIUM (*Nasturtium aquaticum*) filiquis declinatis, foliis pinnatis, foliolis subcordatis. Hort. Cliff. 336. *Sisymbrium with declining pods, and winged leaves whose lobes are almost heart-shaped.* Nasturtium aquaticum supinum. C. B. P. 104. *Water Cress.*
2. SISYMBRIUM (*Sylvestre*) filiquis declinatis, foliis pinnatis, foliolis lanceolatis serratis. Hort. Cliff. 336. *Sisymbrium with declining pods, and winged leaves having spear-shaped sawed lobes.* Eruca palustris, nasturtii folio, filiqua oblonga. C. B. P. 95. *Marsh Rocket with a Cress leaf, and a long pod.*
3. SISYMBRIUM (*Amphibium*) filiquis declinatis, oblongo-ovatis, foliis pinnatifidis serratis. Lin. Sp. Plant. 657. *Sisymbrium with oblong, oval, declining pods, and wing-pointed sawed leaves.* Raphanus aquaticus, foliis in profundas lacinias divisis. C. B. P. 97. *Water Radish with leaves deeply cut.*
4. SISYMBRIUM (*Aquaticum*) foliis simplicibus dentatis serratis. Hort. Cliff. 336. *Sisymbrium with single, indented, sawed leaves.* Raphanus aquaticus alter. C. B. P. 97. *Another Water Radish.*
5. SISYMBRIUM (*Polyceratium*) filiquis axillaribus sessilibus subulatis aggregatis, foliis repando-dentatis. Hort. Upsal. 193. *Sisymbrium with awl-shaped pods in clusters sitting close to the stalks, and indented leaves which turn backward.* Erysimum polyceratum vel corniculatum. C. B. P. 101. *Many-podded or horned Hedge Mustard.*
6. SISYMBRIUM (*Sophia*) petalis calyce minoribus, foliis decomposito-pinnatis. Flor. Suec. *Sisymbrium with petals smaller than the empalement, and compounded winged leaves.* Erysimum sophiæ dictum. Raii Syn. Ed. 3. p. 298. *Hedge Mustard, called Sophia or Flix-weed.*
7. SISYMBRIUM (*Altissimum*) foliis runcinatis flaccidis, foliolis sublinearibus integerrimis, pedunculis laxis. Hort. Upsal. 193. *Sisymbrium with spear, wing-pointed, flaccid leaves, having linear entire lobes with loose foot-stalks.* Rapistrum Italicum filiquis longissimis. C. B. P. 95. *Italian Charlock with very long pods.*
8. SISYMBRIUM (*Irio*) foliis runcinatis dentatis, nudis caule lævi erectis. Lin. Sp. Plant. 659. *Sisymbrium with spear-shaped, winged, indented leaves, and erect pods.* Erysimum latifolium, majus glabrum. C. B. P. 131. *Smooth, greater, broad-leaved Hedge Mustard.*
9. SISYMBRIUM (*Strictissimum*) foliis lanceolatis dentato-serratis caulinis. Hort. Cliff. 337. *Sisymbrium with spear-shaped, winged, indented leaves on the stalks.* Hesperis lutea, filiquis strictissimis. Tourn. Inst. 222. *Yellow Rocket with closed pods.*

The first sort is the common Water Cress, which grows naturally in ditches and rills of water in most parts of England. The roots of this plant are composed of a great number of long fibres, which fasten themselves to the mud at the bottom of the ditches, from which arise several stalks garnished with winged leaves, composed of five or six pair of lobes, which are roundish and almost heart-shaped, terminated by an odd one; these stand almost alternate along the midrib. The stalks rise a foot and a half high; they are hollow, channelled, and divide at the top into two or three branches, which are terminated by loose spikes of small white flowers, composed of four petals placed in form of a cross; these appear the beginning of June, and are succeeded by taper pods filled with small brown seeds which ripen in July.

This plant has of late years been generally used as a salad herb in the spring of the year, and is by many preferred to all other sorts of salads for the agreeable warm bitter taste, and, being accounted an excellent remedy for the scurvy, and to cleanse the blood, as also a good diuretic, it has greatly obtained a preference to most other herbs for winter and spring use with most people. This is generally gathered in the ditches, and in other standing waters near London, to supply the markets; but whoever has a mind to cultivate it may easily do it, by taking some of the plants from the places of their natural growth early in the spring, being careful to preserve their roots as entire as possible, and plant them into mud, and then let the water in upon them by degrees. When they have taken root, they will soon flourish and spread over a large compass of water; they should not be cut the first season, but suffered to run to seed, which will fall into the water, and furnish a sufficient supply of plants afterwards.

But where the water is so deep that it will not be easy to plant them, the best method will be to get a quantity of the plants just as their seeds are ripening, and throw them on the surface of the water where they are designed to grow, and their seeds will ripen, and fall to the bottom, where they will take root, and produce a supply of these plants. These plants produce seed in July, which is the proper time for this work.

Some of those people who gather this herb for use, either through ignorance, or some worse design, have frequently taken the creeping Water Parsnep and sold it for Water Cress, whereby many persons have suffered who have eaten it; therefore those who make use of Water Cress, should be careful to have the right plant; they may be easily distinguished by the shape of their leaves, those of the Water Cress having roundish, almost heart-shaped small leaves or lobes, with a few indentures on their edges, and are of a dark green colour, but those of the Water Parsnep have oblong lobes ending in points; they are of a light green, and sawed on their edges.

The second sort grows naturally on the borders of the river Thames, and in some other parts of England. The leaves of this sort are longer than those of the first; the lobes are much narrower, and are sawed on their edges; the flowers stand upon longer foot-stalks, and are much smaller. This spreads and multiplies in the same manner as the first.

The third and fourth sorts grow naturally on the banks of the Thames, and in ditches in many parts of England, so are not admitted into gardens.

The fifth sort grows naturally in the south of France and Italy; it is an annual plant, whose stalks spread and decline toward the ground; they grow a foot long, and divide into many branches, which are garnished with smooth leaves shaped like the point of a halbert, deeply sinuated on their borders, and indented, whose indentures turn backward. The flowers come out in clusters at the wings of the stalk; they are small, yellow, and are succeeded by slender crooked pods standing in clusters; they appear in June and July, and the seeds ripen in August and September.

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The sixth sort grows naturally in uncultivated places, and also by the side of foot-ways in many parts of England. The leaves of this are divided into many very narrow segments; the stalks rise a foot and a half high; they are garnished with winged leaves, whose lobes are finely cut, resembling those of the true Roman Wormwood. The flowers are produced in loose spikes at the top of the stalk; they are small, yellow, and composed of four petals set in form of a cross; these appear in June, and are succeeded by slender pods filled with small roundish seeds which ripen in August, and then the plant dies. The seeds of this plant are used in medicine, and are by some greatly recommended for the gravel and stoppages of urine.

The seventh sort grows naturally in France and Italy. The lower leaves of this are flaccid, and cut in form of winged leaves ending in arrow-pointed lobes. The stalks rise three or four feet high, garnished with linear wing-pointed leaves; it branches out greatly on every side; the flowers grow sparsely toward the end of the branches, which are succeeded by very long slender pods which are smooth, filled with small yellowish seeds. It flowers in June, the seeds ripen in August, and the plant dies soon after.

The two last are preserved in botanic gardens for the sake of variety. If their seeds are permitted to scatter the plants will come up in plenty, and require no other care but to thin them and keep them clean from weeds; or if their seeds are sown in autumn, they will succeed better than in the spring.

The eighth sort grows naturally in many parts of England, so is seldom admitted into gardens; this is an annual plant which sows itself, and comes up without care. It was remarked, after the great fire of London, that this plant came up in great plenty on the ruins.

The ninth sort grows naturally on the Helvetian mountains; this hath a perennial root, from which arise several branching stalks near three feet high, garnished with spear-shaped leaves, about three inches long and one broad, sawed on their edges, and of a deep green, standing alternately on the stalks. The flowers grow in loose spikes at the top of the stalks; they are small, yellow, and composed of four petals placed in form of a cross; these appear in June, and are succeeded by taper pods filled with small seeds which ripen in August.

This is preserved in some gardens for the sake of variety, but it has no great beauty; it is propagated by seeds, which succeed best when sown in autumn, for those which are sown in the spring seldom come up the same year. The plants require no farther care but to keep them clean from weeds, and love a cool shady situation.

SISYRINCHIUM. Lin. Gen. Plant. 908. Bermudinana. Tourn. Inst. R. H. 387. tab. 208.

The CHARACTERS are,

The sheath which incloses the flowers faces both ways, and is composed of two compressed keel-shaped leaves. The flower has six oblong petals which spread open, and have an acute point, and three very short stamina terminated by bifid summits which are fixed to the base of the style, with an oval germen situated under the flower, supporting an awl-shaped style, crowned by a trifid reflexed stigma. The germen afterward turns to an oval three-cornered capsule with three cells, filled with roundish seeds.

This genus of plants is ranged in the second section of Linnæus's twentieth class, which includes those plants whose flowers have their male and female organs joined, and have three stamina.

The SPECIES are,

1. **SISYRINCHIUM** (*Bermudiana*) foliis gladiolatis amplexicaulibus, pedunculis brevioribus. *Sisyrrinchium with sword-shaped leaves embracing the stalks, and shorter foot-stalks to the flower.* Bermudiana iridis folio fibrosa radice. Tourn. Inst. R. H. 338. *Bermudiana with an Iris leaf and a fibrous root.*
2. **SISYRINCHIUM** (*Angustifolia*) foliis lineari-gladiolatis

pedunculis longioribus. *Sisyrrinchium with linear sword-shaped leaves, and longer foot-stalks to the flower.* Bermudiana graminea, flore minore cæruleo. Hort. Elth. 49. *Grass-leaved Bermudiana with a smaller blue flower.*

3. **SISYRINCHIUM** (*Bulbosa*) foliis plicatis, spathâ biflorâ. *Sisyrrinchium with a plaited leaf, and two flowers in a sheath.* Bermudiana palmæ folio, radice bulbosa. Lign. Tourn. Inst. 381. *Bermudiana with a Palm leaf and a bulbous root.*

The first sort grows naturally in Bermuda, from whence it had the title of Bermudiana given to it by Tournefort; this hath a fibrous root, from which arise some stiff sword-shaped leaves, four or five inches long and half an inch broad, of a dark green colour and entire; between these come out the stalk which rises six inches high; it is compressed, and has two borders or wings running the whole length, and has three or four spear-shaped leaves which embrace it; these grow erect, and are hollowed like the keel of a boat. The stalk is terminated by a cluster of six or seven flowers, standing upon short foot-stalks, which are inclosed by a two-leaved keel-shaped sheath before they open; the flowers are of a deep blue colour with yellow bottoms; they are composed of six oval petals ending in acute points; they spread open, and the flowers, when fully expanded, are an inch over. In the center is situated an upright style, at the bottom of which are three stamina whose summits sit close to it, and the top has a stigma cut into three parts which are reflexed back to the style; these are of a gold colour. The flowers appear in June, and when they fall away, the germen, which was situated under, turns to an oval obtuse capsule with three cells, filled with roundish seeds.

The second sort grows naturally in Virginia; this hath a perennial fibrous root, from which arise many very narrow spear-shaped leaves about three inches long, and scarce an eighth part of an inch broad, of a light green colour, and entire. The stalks rise about three inches high; they are very slender, compressed and bordered like those of the first, and have short, narrow, sword-shaped leaves, whose base embrace them; they are terminated by two small pale blue flowers, inclosed in a two-leaved sheath, standing upon longer foot-stalks than those of the other, which flower about the same time, and their seeds ripen in August.

These two species have been blended together by many botanists, who, it is very probable, have not seen them both, or at least have not had an opportunity of cultivating them, for those who have, can be under no doubt of their being distinct species. I have cultivated both in the same soil and situation upward of twenty years, during which time I frequently raised both sorts from seed, and have never observed either of them alter. The leaves, stalks, and flowers of the first are three times as large as those of the second, and the sheath incloses six or seven flowers; whereas those of the second have rarely more than two, and these do not expand but for a short time in the morning, whereas those of the first sort continue open the whole day.

These plants are propagated by seeds, and also by parting of their roots; if they are raised from seeds, these should be sown in autumn soon after they are ripe, upon an east aspected border, where they may have only the morning sun; the best way will be to sow them in drills at three or four inches distance, covering them about half an inch with light earth. In the spring the plants will appear, when their leaves will have much resemblance to Grass, therefore care should be taken that they are not pulled up as weeds by those who clean the ground. During the first summer they will require no other care but to keep them clean from weeds, unless the plants should come up so close as not to have room to grow, in which case, part of them should be drawn out to give room to the others, and these may be planted in a

shady border at three inches distance, where they may remain till autumn, when they should be transplanted to the places where they are to remain, and the following summer they will flower. These plants love a shady situation and a soft, loamy, undunged soil.

The time for transplanting and flipping off the old roots is early in autumn, that they may get good roots before winter. They are both so hardy as to thrive in the open air in England, and are very rarely injured by cold.

The third sort grows naturally in the West-Indies; this hath a small, oval, bulbous root covered with a bright red skin, from which come out the leaves very like the first leaves of Palm-trees, but of a thinner substance; they are nine or ten inches long and one broad, having five or six longitudinal plaits; they are of a light green, ending with points, and two leaves embrace each other at their base; between these arises the foot-stalk of the flower, which is four inches long, and sustains at the top two or three small blue flowers inclosed in a spatha or sheath; these are composed of six petals which expand like those of the other sorts, but do not continue open longer than three or four hours in the morning, and are closed up the remainder of the day, and when they are expanded, their petals are so small as to make but little appearance. This sort flowers commonly in the middle of summer, but does not keep any particular month; they are never succeeded by seeds in England.

This is propagated by offsets from the roots, which are sent out in plenty; these should be taken off when the roots are transplanted: the time for doing of this is soon after the leaves decay, or before the roots begin to shoot again. They must be planted in small pots filled with light, loamy, undunged earth, and plunged into the tan-bed in the stove, where they should constantly remain, for they are too tender to thrive in this country unless they are thus treated. Their after management is the same as for other bulbous-rooted plants from the same countries.

Sifyrinchium. Tourn. or Spanish Earth-nut, is by Dr. Linnæus referred to the genus Iris or Fleur-de-lis; but, as that is a plant which will not live long in a garden, I have omitted the mentioning of it in this work.

S I U M. Tourn. Inst. R. H. 308. tab 162. Lin. Gen. Plant. 310. Sifarum. Tourn. Inst. R. H. 308. tab. 163. Water Parsneps, and Skirrets; in French, *Chervi*.

The CHARACTERS are,

It hath an umbellated flower; the general umbel is various in different species, the small ones are plain and spreading. The general involucre is composed of several short, spear-shaped, reflexed leaves; those of the smaller are of very small narrow leaves. The general umbel is uniform; the flowers have five inflexed petals which are equal; they have five stamina terminated by single summits, and a small germen situated under the flower, supporting two reflexed styles, crowned by obtuse stigmas. The germen afterward becomes a roundish, oval, streaked fruit splitting in two, each part containing one streaked seed, plain on one side, and convex on the other.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and two styles. To this genus he adds the Sifarum of Tournefort.

The SPECIES are,

1. S I U M (*Latifolium*) foliis pinnatis, umbellis terminalibus. Hort. Cliff. 98. *Sium with winged leaves, and the stalk terminated by an umbel.* Sium latifolium. C. B. P. 154. *The great Water Parsnep.*
2. S I U M (*Angustifolium*) foliis pinnatis serratis, umbella terminali. Sium with winged sawed leaves, and umbels terminating the stalks. Sium five apium palustre, foliis oblongis. C. B. P. 154. *Common, upright, Water Parsnep.*
3. S I U M (*Nodiflorum*) foliis pinnatis, umbellis axillaribus

sessilibus. Hort. Cliff. 98. *Sium with winged leaves, and umbels of flowers sitting close to the wings of the stalks.* Sium umbellatum repens. Ger. Emac. 256, 258. *Creeping Water Parsnep.*

4. S I U M (*Sifarum*) foliis pinnatis, floribus ternatis. Hort. Cliff. 98. *Sium with winged lower leaves, but those under the flowers trifoliate.* Sifarum Germanorum. C. B. P. 155. *German Skirrets.*

5. S I U M (*Falcaria*) foliolis linearibus decurrentibus connatis. Hort. Cliff. 98. *Sium with linear small leaves, having running membranes which join at their base round the stalk.* Ammi perenne. Mor. Umb. *Perennial Bishop-weed.*

6. S I U M (*Siculum*) foliis radicalibus ternatis, caulinis bipinnatis. Prod. Leyd. 105. *Sium with trifoliate bottom leaves, and those on the stalks doubly winged.* Myrrhis foliis pastinacæ læte virentibus. Tourn. Cor. 33. *Myrrh with light green Parsnep leaves.*

The first sort is the great Water Parsnep, which grows naturally in deep waters in several parts of England; it rises with upright stalks five or six feet high, garnished with large winged leaves shaped like those of the common Parsnep, and the stalk is terminated by large umbels of pale yellow flowers. This plant flowers in June and July, and the seeds ripen the end of August; it is never cultivated in gardens.

The second sort is the common upright Parsnep, which grows naturally in ditches in most parts of England; this rises with an upright branching stalk near three feet high, garnished with winged leaves composed of three or four pair of oblong sawed lobes terminated by an odd one. The stalk is terminated by an umbel of white flowers which appear in June, and are succeeded by seeds which ripen in autumn; this is rarely cultivated, as it is a common weed in ditches and standing waters. Both these plants have been recommended by ancient physicians for their virtues in medicine, but at present they are seldom used.

The third sort is very common in standing waters in most parts of England. The stalks spread over the surface, and produce umbels of white flowers at their joints. This is the plant which is frequently gathered and sold for Water Cress, as is before mentioned under the article SISYMBRIUM.

The fourth sort is the common Skirret, which was formerly more cultivated in the English gardens than at present. The roots are the only part used, and although it is mentioned in most Dispensaries as a medicinal plant, yet it is rarely used as such, being better adapted for the kitchen. It is esteemed a wholesome root, affording good nourishment, but has a flatulency, and its very sweet taste is disagreeable to many palates.

The root of this plant is composed of several fleshy fibres as large as a man's little finger, which join together in one head. The lower leaves are winged, having two or three pair of oblong lobes terminated by an odd one; the stalk rises a foot high, and is terminated by an umbel of white flowers which appear in July, and are succeeded by striated seeds like those of Parsley, which ripen in autumn.

This plant is cultivated two ways, first by seeds, and afterward by slips from the root: the former method I think the more eligible, because the roots which are raised from seeds, generally grow larger than those raised by slips, and are less subject to be sticky. The seeds should be sown the latter end of March or the beginning of April, either in broad cast or in drills; the ground should be light and moist, for in dry land the roots are generally small, unless the season proves very moist. If the seeds are good, the plants will appear in five or six weeks after they are sown, and, when they have put out their leaves so as to be well distinguished from the weeds, the ground should be hoed over to destroy the weeds in the same manner as is practised for Carrots; and where the seeds are sown in broad cast, the plants should be cut up, leaving them at the same distance as Carrots. Those sown in the drills should be also thinned to the distance of four inches,

inches, and the ground hoed over to destroy the weeds. This should be repeated three times, as is usually done for Carrots, which, if well performed in dry weather, will keep the ground clean all the first part of the summer, so that unless there should be much rain about Midsummer, there will be scarce any necessity for farther cleaning of the plants, for their leaves will spread, and prevent the growth of weeds afterward. In autumn, when the leaves begin to decay, the roots will be fit for use, and may be continued all the winter till they begin to shoot in the spring, when they will become sticky, as will also any of those which run up to seed the first summer, so that all such should be pulled up and thrown away.

The time for propagating this plant by offsets is in the spring, before they begin to shoot, at which time the old roots should be dug up, and the side roots should be slipped off, preserving an eye or bud to each; these should be planted in rows one foot asunder, and four inches distant in the rows. If the ground is light, this may be performed with a dibble, but for stiff land it will be best to make a trench with a spade, in the same manner as for Asparagus, laying the roots therein at a proper distance. The ground must be kept clean by hoeing it in the same manner as before directed, and at the season the roots will be fit for use.

The fifth sort is a perennial plant, which grows naturally in Germany. The roots of this plant creep and spread very far under ground; the least part of them will grow, so that when it is once brought into a garden, it will soon multiply; they are thick, fleshy, and taste like those of Eryngo. The leaves are divided into linear segments, and their base embrace the stalks, which rise two feet high, and are terminated by large flat umbels of white flowers, which appear in July, but their seeds do not often ripen here.

The sixth sort grows naturally in Sicily, and is preserved in botanic gardens for the sake of variety. The lower leaves are pretty broad, trifoliate, and of a lucid green; the stalk rises two feet high, and is terminated by an umbel of yellow flowers in July; the leaves on the stalks are doubly winged, and the seeds ripen in autumn, which should be sown soon after they are ripe.

SMALLAGE. See APIUM.

SMILAX. Tourn. Inst. R. H. 654. tab. 421. Lin. Gen. Plant. 992. Rough Bindweed.

The CHARACTERS are,

It is male and female in different plants. The male flowers have a six-leaved, open, bell-shaped empalement; they have no petals, but have six stamina terminated by oblong summits. The female flowers have the like empalement, but they fall off; they have no petals or stamina, but have an oval germen, supporting three very small styles, crowned by oblong reflexed stigmas. The germen afterward turns to a globular berry with two cells, containing two globular seeds.

This genus of plants is ranged in the sixth section of Linnæus's twenty-second class, which includes those plants which have male and female flowers situated upon different plants, whose male flowers have six stamina.

The SPECIES are,

1. SMILAX (*Aspera*) caule aculeato angulato, foliis dentato-aculeatis cordatis. Lin. Sp. Plant. 1028. *Smilax with an angular prickly stalk, and heart-shaped, prickly, indented leaves. Smilax aspera, fructu rubente.* C. B. P. 296. *Rough Bindweed with a red fruit.*
2. SMILAX (*Excelsa*) caule aculeato angulato, foliis cordatis inermibus. *Smilax with an angular prickly stalk, and smooth heart-shaped leaves. Smilax orientalis, farnentis aculeatis, excelsas arbores scandentibus, foliis non spinosis.* Tourn. Cor. 45. *Eastern rough Bindweed, with prickly runners climbing the tallest trees, and leaves not prickly.*
3. SMILAX (*Sarsaparilla*) caule aculeato angulato, foliis inermibus retuso-cordatis. *Smilax with an angular*

prickly stalk, and retuse, heart-shaped, unarmed leaves. Smilax viticulis asperis Virginiana, folio hederaceo leni Zarza nobilissima. Pluk. Alm. 348. *Virginia rough Bindweed with prickly Vines, and a smooth Ivy leaf, called Zarza.*

4. SMILAX (*Tamnoides*) caule aculeato tereti, foliis inermibus cordatis oblongis septemnerviis. Lin. Sp. Plant. 1030. *Smilax with a taper prickly stalk, and oblong, heart-shaped, unarmed leaves with seven veins. Smilax bryoniæ nigræ foliis, caule spinoso, baccis nigris.* Catesb. Carol. 1. p. 52. *Rough Bindweed with black Briony leaves, a prickly stalk, and black berries.*
5. SMILAX (*China*) caule aculeato teretiufculo, foliis inermibus ovato-cordatis quinquenerviis. Lin. Sp. Plant. 1029. *Smilax with a taper prickly stalk, and oval, heart-shaped, unarmed leaves, having five veins. Radix China.* C. B. P. 496. *China-root.*
6. SMILAX (*Caduca*) caule subaculeato tereti, foliis inermibus cordatis trinerviis. *Smilax with a taper stalk having a few small thorns, and unarmed heart-shaped leaves with three veins.*
7. SMILAX (*Aristolochiæfolia*) caule aculeato tereti, foliis inermibus sagittatis obtusiusculis trinerviis. *Smilax with a prickly taper stalk, and very blunt, halbert-pointed, unarmed leaves. Smilax aspera aristolochiæ, foliis longioribus, ad basin auriculatis.* Houst. MSS. *Rough Bindweed with longer Birthwort leaves, eared at their base.*
8. SMILAX (*Spinosa*) caule aculeato tereti, foliis ovato-lanceolatis nervis foliorum infernè aculeatis. *Smilax with a taper prickly stalk, and oval spear-shaped leaves whose veins on the under side are prickly. Smilax viticulis asperis, foliis oblongis, nervis foliorum spinosis.* Houst. MSS. *Rough Bindweed with a prickly stalk, and oblong leaves with prickly veins.*
9. SMILAX (*Virginiana*) caule aculeato angulato, foliis lanceolatis inermibus, acuminatis. *Smilax with an angular prickly stalk, and spear-shaped, acute-pointed, unarmed leaves. Smilax viticulis asperis Virginiana, foliis angustis lævibus nullis auriculis prædita.* Pluk. Phyt. tab. 110. fig. 4. *Virginian rough Bindweed with prickly veins, and narrow smooth leaves without ears.*
10. SMILAX (*Canellæfolia*) caule inermi tereti, foliis inermibus ovatis trinerviis. *Smilax with an unarmed taper stalk, and oval unarmed leaves with three veins. Smilax Virginiana, spinis innocuis armata latis canellæ foliis, radice arundinacea crassa & carnosa.* Pluk. Phyt. 110. fig. 5. *Rough Bindweed of Virginia armed with innocent spines, a broad Cinnamon leaf, and a thick, fleshy, Reed-like root.*
11. SMILAX (*Humilis*) caule inermi tereti, foliis inermibus ovato-cordatis trinerviis, floribus corymbosis. *Smilax with a taper unarmed stalk, oval, heart-shaped, unarmed leaves, and flowers in a corymbus. Smilax humilis, non spinosa, foliis aristolochiæ, baccis rubris.* Catesb. Car. 1. p. 47. *Dwarf rough Bindweed without spines, Birthwort leaves, and red berries.*
12. SMILAX (*Hederæfolia*) caule inermi tereti, foliis inermibus, caulinis cordatis, racemis ovato-oblongis. Lin. Sp. Plant. 1031. *Smilax with an unarmed taper stalk, unarmed, heart-shaped leaves on the stalks, and oval oblong bunches of flowers. Smilax claviculata, hederæ folia tota lævis è terrâ Mariana.* Pluk. Phyt. tab. 225. fig. 3. *Rough Bindweed with clasps, and an Ivy leaf totally smooth, from Maryland.*
13. SMILAX (*Laurifolia*) caule inermi tereti, foliis inermibus lanceolatis. *Smilax with a taper unarmed stalk, and spear-shaped unarmed leaves. Smilax lævis, lauri folio, baccis nigris.* Catesb. Car. 1. p. 15. *Smooth Bindweed, with a Bay leaf and black berries.*

The first sort grows naturally under hedges and in woods in Italy and Spain. The roots are composed of many thick fleshy fibres, which spread wide on every side, and strike deep in the ground, from which come out several stalks which are slender, angular, armed with short crooked spines, and have clasps on their sides, by which they fasten themselves to any neighbouring plant for support, and rise five or six feet high. The leaves are stiff, heart-shaped, and

acute-pointed, about three quarters of an inch broad at their base, where they are eared, drawing narrower to a point, and about two inches long; they are of a dark green, and have five longitudinal veins; their edges are set with a few short reddish spines. The flowers come out from the wings of the stalk in short bunches; they are small and whitish, having no petals. Those on the female plants are succeeded by red berries which ripen in autumn.

The second fort grows naturally in Syria. The roots of this are like those of the former; the stalks are four-cornered and prickly; these fasten themselves to the trees near them by their clasps, and mount to their tops. The leaves are heart-shaped, two inches long, and an inch and three quarters broad at their base; they have no spines on their edges, but have five veins running lengthways. The flowers and fruit are like those of the first fort.

The third fort grows naturally in Virginia. The roots of this are like those of the former; the stalks are angular and prickly; the leaves are heart-shaped, turning backward, and unarmed; the flowers are small, and come out in long loose bunches from the wings of the stalks; the berries are small and red.

The fourth fort grows naturally in Carolina. The roots are like the former; the stalks are taper and prickly; the leaves are oblong, heart-shaped, four inches long, and two inches and a half broad at their base, having no spines, but seven longitudinal veins; the flowers come out in long loose bunches from the side of the stalks, and the berries are black.

The fifth fort grows naturally at Carthage in New Spain. The roots of this are like the former; the stalks are taper, very strong, and armed with short stiff spines; they fasten themselves by their clasps to the neighbouring trees, and rise twenty feet high. The leaves are of a thick substance, and have no spines; they are oval, heart-shaped, four inches long, and three and a half broad at their base, ending in an obtuse point, and have five longitudinal veins. The flowers are like those of the other species, but grow in close bunches, and the berries are red. This is the same with a plant which I received from China by the title of China-root.

The sixth fort grows naturally at Carthage in New Spain; this hath very strong taper stalks, which are armed with a very few short spines. The leaves are thick, unarmed, and heart-shaped; they are five inches long, and three inches and a half broad at their base, ending with an acute point. This fort climbs on the neighbouring trees, and rises thirty feet high. The flowers of this I have not seen.

The seventh fort grows naturally at La Vera Cruz in New Spain; this hath a thick, taper, prickly stalk, which climbs up the neighbouring trees to the height of thirty or forty feet. The leaves are thick, stiff, and unarmed; they are seven inches long, and have two round ears at their base, where they are three inches and a half broad, but the other part of the leaves are two inches broad at their top, where they are rounded; they have three longitudinal veins, and stand on short foot-stalks.

The eighth fort grows naturally at La Vera Cruz; this hath slender, taper, prickly stalks, which fasten themselves to any neighbouring support by their clasps, and rise eight or ten feet high. The leaves are oval, spear-shaped, four inches and a half long, and two and a half broad in the middle; they have no spines on their edges, but their midrib and veins on their under side are armed with short reddish spines.

The ninth fort grows naturally in Jamaica. The stalks of this are slender, angular, and prickly; the leaves are spear-shaped, ending in acute points; they are three inches long, and half an inch broad, having no spines; their base is a little rounded, but have no ears.

The tenth fort grows naturally in Jamaica; this hath thick, fleshy, creeping roots. The stalks are taper and unarmed; these climb up the neighbouring trees

and bushes to the height of ten or twelve feet. The leaves are oval, and end in acute points; they are five inches long and three broad, and have three longitudinal veins, but have no spines.

The eleventh fort grows naturally in Carolina; this hath taper unarmed stalks which rise three or four feet high. The leaves are oval, heart-shaped, about three inches long, and almost two broad, rounded at their points, and have three longitudinal veins. The flowers come out from the wings of the stalk at every joint, standing upon short foot-stalks, formed in a round bunch; these are succeeded by roundish red berries.

The twelfth fort grows naturally in Jamaica, and also in Maryland. The stalks of this are ligneous, taper, and unarmed; these have very long clasps, by which they fasten to any neighbouring support, and rise twenty feet high. The leaves are some oval, and others are heart-shaped; they are about three inches and a half long, and two and a half broad. The flowers come out from the wings of the stalk in oblong bunches; these are succeeded by red berries.

The thirteenth fort grows naturally in Carolina; this hath a thick, taper, unarmed stalk, which rises by the help of neighbouring bushes and trees ten or twelve feet high. The leaves are thick, spear-shaped, and unarmed, about three inches and a half long, and one inch and a half broad. The flowers come out from the wings of the stalk in round bunches, which are succeeded by black berries.

These plants are many of them preserved in the gardens of the curious for the sake of variety, but some of them may so be disposed as to make them ornamental, because those sorts which grow naturally in North America, and the two first sorts, are so hardy as to thrive in the open air in England; and as they retain their verdure all the year, if the plants are placed on the borders of woods or groves in gardens, and their branches properly supported, they will screen the nakedness of the ground under the trees from sight, and in winter, when their leaves are in beauty, they will make a pleasing variety, when the plants are properly intermixed with other evergreens; and as some of the forts will rise five or six feet high, they will shut out from view any disagreeable objects.

Those forts which require a stove to protect them in winter are little esteemed, because they require much room; and as their flowers have no beauty to recommend them, few persons care to be at the trouble of preserving them for that of their leaves, because there are many other plants whose leaves make a better appearance, and the plants do not require so much room, so these plants are rather the proper furniture of botanic gardens than those of pleasure.

They are all propagated by seeds, which must be procured from the countries where they naturally grow, for there are none of these plants which produce ripe seeds here. Those sorts which have been brought from the north of America, sometimes produce flowers in England, but the summers here are neither warm enough, nor of a proper duration to ripen their seeds, so that these are propagated by parting of their roots; for when the roots have obtained strength, they spread very far in the ground, and send up stalks at a distance from the old roots, whereby they may be greatly increased when the forts are once obtained. The best time for transplanting and parting of their roots is early in autumn, that the offsets or young plants may have time to get good roots before the frost comes on; and if after they are planted, the cold should come on earlier, or be more severe than ordinary, if the surface of the ground about their roots is covered with some old tanners bark or mulch to keep the frost out of the ground, it will preserve them; but these roots should not be parted oftener than every third or fourth year, for unless the roots are large, there will be few stalks to each, and therefore will make but little appearance.

The tender forts must be kept in pots, and plunged into the tan-bed of the bark-stove, in order to have them

them strong; for although they will live in a moderate warmth in winter, they will make but little progress, and their stalks will be short, their leaves small, and the plants weak, so will make but a poor appearance; therefore, unless they can be allowed room in the warm stove, and constantly kept in the tan-bed, they will not be worth preserving.

All the sorts grown naturally under hedges and in woods, therefore they should be disposed in a such a manner, as to imitate their places of growth, and not place them in the open sun, where they will not thrive; therefore the hardy kinds should be placed under the shade of trees, and the tender ones may be placed between the pots which contain tall plants, whose branches may screen them from the sun. Such of these plants as are tender must be frequently watered in hot weather, and should then have a large share of air admitted to them, but in winter they must be watered sparingly, for their roots are apt to rot with too much wet.

When the seeds of these plants are obtained from abroad, they should be sown in pots filled with fresh light earth, and plunged into a moderate hot-bed, observing to water the earth frequently to keep it moist, because the seeds, being hard, will not vegetate without a considerable share of moisture; these generally remain in the ground a whole year before they grow, so that if the plants do not come up the first season, the pots should be kept clean from weeds all the summer, and in winter the hardy sorts should be sheltered from frost under a common frame, and the tender ones plunged into the bark-bed in the stove: the following spring they must be again plunged into the hot-bed, which will bring the plants up very soon. When the plants are come up, they must be constantly kept clear from weeds, and frequently watered in warm weather, and toward the end of May the hardy sorts should be inured to the open air by degrees, and in June they may be removed out of the bed, and placed abroad in a sheltered situation, where they should remain till the frost comes on in autumn, when they must be removed into shelter. If the pots are plunged into an old tan-bed under a frame, where they may be protected from the frost, and in mild weather be exposed to the open air, they will thrive much better than with more tender treatment.

The tender sorts should be plunged between the other pots in the bark-bed of the stove, where they should remain all the winter. These plants should remain untransplanted in the seed-pots till the following spring, when they should be turned out of the pots, carefully separated, and planted into pots filled with fresh earth; and if the hardy sorts are plunged into a very temperate hot-bed, it will cause them to take new root very soon, and greatly strengthen the plants; but the tender sorts should be plunged into a good hot-bed of tanners bark to bring the plants forward, that they may get strength before winter, when they must be treated in the manner before directed.

The hardy sorts should be kept in pots for two or three years that they may be sheltered in winter, by which time they will have strength enough to bear the cold in the open air; so in the spring they may be turned out of the pots, and planted where they are designed to remain, observing, if the spring should prove dry, to refresh them now and then with water, as also to lay some mulch about them to prevent the earth from drying; and while the plants are young, if some mulch is laid about their roots in winter, it will be a sure method to preserve them.

SMYRNIUM. Tourn. Inst. R. H. 315. tab. 168. Lin. Gen. Plant. 363. Alexanders, or Alifanders; in French, *Maçeron*.

The CHARACTERS are,

It has an umbellated flower; the principal umbel is unequal, the small ones are erect; they have no involucre, and the empalement of the flowers are scarce discernible. The flowers have five spear-shaped petals which are a little inflexed, and five stamina the length of the petals, terminated by single summits. The germen is situated under the flower, supporting two styles crowned by beaded

stigmas. The germen afterward turns to an almost globular fruit which is streaked and splits in two, each containing one moon-shaped seed, convex on one side, marked with three streaks, and plain on the other.

This genus of plants is ranged in the second section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. SMYRNIUM (*Olusatrum*) foliis caulinis ternatis petiolatis ferratis, Hort. Cliff. 105. *Smyrniium with trifoliate leaves on the stalks, which are sawed and have foot-stalks. Hippofelinum Theophrasti five smyrniium Dioscoridis. C. B. P. 154. Common Alexanders, or Alifanders.*
2. SMYRNIUM (*Rotundifolium*) foliis caulinis orbiculatis integerrimis amplexicaulibus. *Smyrniium with orbicular leaves on the stalks which embrace them. Smyrniium peregrinum rotundo folio. C. B. P. 152. Foreign Alexanders with a round entire leaf.*
3. SMYRNIUM (*Perfoliatum*) foliis caulinis simplicibus amplexicaulibus. Lin. Sp. 376. *Alexanders with simple leaves which embrace the stalks. Smyrniium peregrinum folio oblongo. C. B. P. 154. Foreign Alexanders with an oblong leaf.*
4. SMYRNIUM (*Creticum*) foliis caulinis ternatis ferratis, summis oppositis sessilibus, *Alexanders with lower leaves by threes which are sawed, and those at the top by pairs sitting close to the stalks. Smyrniium Creticum paludapi folio. Tourn. Cor. 22. Cretan Alexanders with a Smallage leaf.*
5. SMYRNIUM (*Integerrimum*) foliis caulinis duplicato ternatis integerrimis. Lin. Sp. Plant. 263. *Alexanders with double trifoliate leaves on the stalks, which are entire.* The first sort grows naturally on the rocks by the sea-shore in Wales, the North of England, and in Scotland. It is also found growing wild in many places near London, but here it may be supposed to have been thrown out of gardens; for as it was formerly cultivated in gardens for the table, so the seeds may have been scattered, which will grow wherever they alight.

The lower leaves of this plant resemble those of Smallage, but they are much larger; the lobes are rounder, and are sawed on their edges. The stalks rise from three to four feet high, which are furrowed, and branch into many divisions; these are garnished with trifoliate leaves of the same shape and form with the lower, but are smaller. The branches are terminated by large umbels of white flowers, which appear in June, and are succeeded by large roundish fruit, containing two moon-shaped seeds which ripen in August, and then the plant decays. The whole plant has a strong warm taste.

The second sort grows naturally in Sicily and Crete; the lower leaves of this sort are decomposed of small leaves, which divide by threes; their lobes are oval and indented on their edges; the stalk is smooth, hollow, and rises three feet high, dividing toward the top into two or three branches; at each joint is placed one large orbicular leaf, whose base embraces the stalk; these are of a yellow green colour, and their edges are entire; the branches are terminated by small umbels of yellowish flowers, whose smaller umbels or rays are of unequal lengths. The seeds are black and shaped like those of the former, but are smaller.

The third sort grows naturally in Crete; the lower leaves of this are larger than those of the former, but are composed of several winged divisions. The stalk does not rise so high as that of the last mentioned, but is angular and not so hollow; the leaves upon the stalks are much larger; they are of the heart-shaped oval kind, and are indented on their edges, and embrace the stalks with their base; their colour is nearly the same with the former, but they are of a thinner texture. The umbels of flowers are smaller, as are also the seeds.

These two sorts have been frequently blended together by botanists, who have supposed they were but one species; but I have cultivated both many years, and have not found either of them alter.

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The fourth sort grows naturally in Crete; the lower leaves of this are smaller than those of the first sort, and are more like those of Smallage; the stalk rises higher, and grows more erect than those of the first; the leaves on the lower part of the stalk are large, and sawed on their edges; they stand by threes round the stalk at the joints; their base set close, having no foot-stalks; the upper part of the stalk and branches are garnished with leaves of the same form, which stand by pairs. The umbels of flowers are much smaller, and the seeds are less.

These sorts are most of them biennial, perishing after their seeds are ripe; they flower in June, and their seeds ripen in August.

The first of these sorts is that ordered by the college for medicinal use, but is seldom now prescribed; and at present is seldom cultivated in gardens, though formerly it was greatly used in the kitchen, before Celery was so much cultivated, which hath taken place of Alexanders, and entirely supplanted it. The other sorts are preserved in botanic gardens for variety, but may either of them be cultivated for the use of the kitchen. The second sort is much preferable to the first for blanching, as I have tried, and will be tenderer, and not quite so strong.

All these plants may be propagated by sowing their seeds upon an open spot of ground in August, as soon as they are ripe; for if they are preserved till spring, they often miscarry, or at least do not come up until the second year; whereas those sown in autumn rarely fail of coming up in the spring, and will make much stronger plants than the other.

The common sort, when cultivated for the table, should be treated in the following manner:

In the spring the plants should be hoed out, so as to leave them ten inches or a foot apart each way; and, during the following summer, they must be constantly cleared from weeds, which, if permitted to grow amongst them, will draw them up slender, and render them good for little. In February following the plants will shoot up again vigorously, at which time the earth must be drawn up to each plant, to blanch them, and in three weeks after they will be fit for use, when they may be dug up, and the white part preserved, which may be stewed and eaten as Celery.

SNAP-DRAGON. See ANTIRRHINUM.

SNEEZWORT. See ACHILLEA.

SNOW is defined to be a meteor formed in the middle region of the air, of vapour raised by the action of the sun, or subterraneous fire there congealed, its parts constipated, its specific gravity increased, and thus returned to the earth in the form of little villi or flakes.

The Snow we receive may properly enough be ascribed to the coldness of the atmosphere through which it falls; when the atmosphere is warm enough to dissolve the Snow before it arrives at us, we call it rain; if it preserves itself undissolved, we call it Snow. Snow is very useful; it fructifies the ground; it guards Corn, or other vegetables from the intenser cold of the air, especially the cold piercing winds.

It is supposed to abound with salific and fertile particles, as much or more than rain; however, it is accounted more ponderous, and by that means sinks deeper into the ground than rain does, and therefore is in some cases of more benefit to planting; for which reason, some lay heaps of Snow round the feet of their forest-trees, especially in hot burning lands.

Monf. le Clerc says, that some parts of a cloud which should turn to rain, are sometimes prevented by the cold, and formed into a consistence which we call Snow, which appears to be formed from watery particles, from hence, that when it dissolves, it turns into water; so that we may easily conceive Snow to be made of watery particles, hardened by cold and gathered into flakes, in such a manner as to leave large interstices between one another; which Snow is not transparent, as the water, because the more rigid particles, being huddled together by chance, do not

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leave strait pores between one another, and so keep out the matter of light.

But when it happens, that the region of the air under the cloud is very cold, the drops of rain are congealed as they fall, and come down in lumps, which are called hail; and these lumps are greater or less, according to the bigness of the rain drops of which they are formed, and these lumps of hail are also variously figured.

Dr. Grew, in a discourse of the nature of Snow, observes, that many parts thereof are of a regular figure, for the most part, being, as it were, so many little rowels or stars, of perfect transparent ice; upon each of which points are set other collateral points; at the same angles as the main points themselves; amongst these are divers other irregular, which are chiefly broken points and fragments of the regular ones; others also, by various winds, seem to have been thawed, and frozen again into irregular clusters, so that it seems as if the whole body of Snow were one entire mass of icicles irregularly figured; that is, a cloud of vapours being gathered into drops, the said drops do forthwith descend, and in their descent meeting with a freezing air as they pass through a colder region, each drop is immediately frozen into an icicle, shooting itself forth into several points; but still continuing to descend, and meeting with some intermitting gales of warmer air, or by their being continually waisted to and fro, touching upon one another, some are a little thawed, blunted, and again frozen into clusters, or entangled, so as to fall again into what we call flakes; although Snow is firm ice, and the lightness of it is owing to the excess of its surface, in comparison to the matter contained in it; as gold itself may be extended in surface, till it will ride upon the least breath of air.

SNOWDROP. See GALANTHUS.

SOIL. See EARTH.

SOLANOIDES. See PIERCEA.

SOLANUM. Tourn. Inst. R. H. 148. tab. 62. Lin. Gen. Plant. 224. [so called of solari, Lat. to comfort, because this plant sweetens the humours.] Nightshade; in French, Morelle.

The CHARACTERS are,

The empalement of the flower is permanent, of one leaf, cut half through into five acute segments. The flower has one wheel-shaped petal, having a very short tube; the brim is large, spreading, and five-pointed. It has five small awl-shaped stamina, terminated by oblong summits which stand together, and a roundish germen supporting a slender style longer than the stamina, crowned by an obtuse stigma. The germen afterward turns to a roundish berry with two cells, having a convex fleshy receptacle, and filled with roundish compressed seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one style.

The SPECIES are,

1. SOLANUM (*Nigrum*) caule inermi herbaceo, foliis ovatis decemangularibus umbellis nutantibus. Lin. Sp. 266. *Nightshade with an herbaceous unarmed stalk, having ten angles and nodding umbels. Solanum officinarum, acinis nigricantibus. C. B. P. 166. Common Nightshade of the shops with a black fruit.*
2. SOLANUM (*Villosum*) caule inermi herbaceo ramis teretibus foliis angulatis, umbellis nutantibus. *Nightshade with a woolly, herbaceous, unarmed stalk, oval indented leaves which are taper, and nodding umbels. Solanum officinarum, acinis puniceis. C. B. P. 166. Nightshade with red fruit.*
3. SOLANUM (*Luteum*) caule inermi herbaceo, foliis ovato-lanceolatis acuminatis tomentosis, umbellis nutantibus. *Nightshade with an herbaceous unarmed stalk, oval, spear-shaped, acute-pointed, indented, woolly leaves, and nodding umbels. Solanum officinarum, acinis luteis. C. B. P. 166. Nightshade with yellow berries.*
4. SOLANUM (*Rubrum*) caule inermi herbaceo glabro, foliis oblongo-ovatis acuminatis dentatis glabris, umbellis nutantibus. *Nightshade with an herbaceous, unarmed,*

- armed, smooth stalk, oblong, oval, acute-pointed, indented leaves, and nodding umbels. *Solanum Americanum*, vulgari simile, acinis rubris. Rand. *American Nightshade* like the common sort, with red berries.
5. *SOLANUM* (*Americanum*) caule inermi herbaceo, foliis ovatis acuminatis glabris, umbellis erectis. *Nightshade* with an herbaceous unarmed stalk, oval, acute-pointed, smooth leaves, and erect umbels. *Solanum Americanum* vulgari simile, flore parvo purpurascens, acinis nigricantibus minoribus. Rand. *American Nightshade* like the common sort, with a small purplish flower, and smaller black berries.
6. *SOLANUM* (*Scabrum*) caule herbaceo subaculeato, foliis ovatis obtusis integerrimis, petiolis longissimis, umbellis nutantibus. *Nightshade* with an herbaceous stalk a little prickly, oval, obtuse, entire leaves on very long foot-stalks, and nodding umbels. *Solanum nigrum* vulgari simile, caulibus exasperatis. Hort. Elth. 368. *Black Nightshade* like the common sort, with rough stalks.
7. *SOLANUM* (*Guineense*) caule inermi herbaceo, foliis oblongo-ovatis acuminatis glabris subdentatis, umbellis nutantibus. *Nightshade* with an herbaceous, angular, unarmed stalk, oblong, oval, acute-pointed, smooth leaves a little indented, and nodding umbels. *Solanum Guineense*, fructu magno instar cerasi nigerrimo umbellato. Boerh. Ind. alt. 2. p. 68. *Nightshade* from Guinea, with a large fruit like black Cherries, in umbels.
8. *SOLANUM* (*Dulcamara*) caule inermi frutescente flexuoso, foliis superioribus hastatis, racemis cymosis. Hort. Cliff. 60. *Nightshade* with a shrubby, bended, unarmed stalk, the upper leaves spear-shaped, and bunches of flowers at the top of the stalk. *Solanum scandens*, seu *dulcamara*. C. B. P. 166. *Perennial climbing Nightshade*, commonly called *Bitter-sweet*.
9. *SOLANUM* (*Pseudocapsicum*) caule inermi fruticoso, foliis lanceolatis repandis, umbellis sessilibus. Lin. Sp. Plant. 184. *Nightshade* with a shrubby unarmed stalk, spear-shaped leaves turning inward, and the umbels sitting close to the stalks. *Solanum fruticosum* bacciferum. C. B. P. 167. *Shrubby berry-bearing Nightshade*, commonly called *Anomum Plinii*.
10. *SOLANUM* (*Igneum*) caule aculeato fruticoso, foliis lanceolatis anguloso-dentatis. Hort. Cliff. 61. *Nightshade* with a shrubby prickly stalk, and spear-shaped leaves which are angularly indented. *Solanum spiniferum* frutescens, spinis igneis, *Americanum*. Pluk. Phyt. tab. 225. fig. 5. *Shrubby and thorny American Nightshade*, with fire-coloured thorns.
11. *SOLANUM* (*Tomentosum*) caule aculeato fruticoso, foliis ovatis dentato-angulatis utrinque tomentosis, pedunculis spinosis. *Nightshade* with a shrubby prickly stalk, oval, angular, indented leaves, woolly on every side, and prickly foot-stalks to the flowers. *Solanum spinosum*, maxime tomentosum. Bocc. Rar. Plant. *Thorny Nightshade*, very much covered with a wool or down.
12. *SOLANUM* (*Sodomæum*) caule aculeato fruticoso, foliis pinnato-laciniatis obtusis utrinque aculeatis. *Nightshade* with a shrubby prickly stalk, wing-pointed leaves which are obtuse, and have spines on both sides. *Solanum pomiferum* frutescens *Africanum* spinosum nigricans, flore boraginis, foliis profunde laciniatis. H. L. *Shrubby African Apple-bearing Nightshade* with black thorns, a flower like Borage, and deeply jagged leaves, commonly called *Pomum Amoris*.
13. *SOLANUM* (*Indicum*) caule aculeato fruticoso, foliis cuneiformibus angulatis subvillosis. *Nightshade* with a shrubby prickly stalk, angular, indented, woolly leaves, and the flowers in long bunches at the wings of the stalk. *Solanum Indicum* spinosum boraginis flore. Icon. Robert. H. R. Par. *Prickly Indian Nightshade* with a flower like Borage.
14. *SOLANUM* (*Acanthifolium*) caule aculeato herbaceo, foliis sinuatis utrinque aculeatis, umbellis erectis, calycibus echinatis. *Nightshade* with a prickly herbaceous stalk, sinuated leaves armed with spines on both sides, upright umbels, and very prickly empalements. *Solanum Americanum* spinosum herbaceum, acanthi folio, flore amplo cæruleo. Houst. MSS. *Prickly, herbaceous, Ame-*

rican Nightshade, with a Bear's-breech leaf and a large blue flower.

15. *SOLANUM* (*Angustifolium*) caule aculeato fruticoso, foliis pinnato-laciniatis tomentosis, utrinque aculeatis, pedunculis axillaribus bifloris. *Nightshade* with a prickly shrubby stalk, wing-cut leaves which are woolly, and prickly on both sides, and foot-stalks with two flowers at the wings of the stalks. *Solanum Americanum* spinosissimum herbaceum, anguriæ folio, flore luteo. Houst. *The most prickly American Nightshade*, with a *Water-Melon* leaf and a yellow flower.
16. *SOLANUM* (*Quercifolium*) caule aculeato fruticoso, foliis oblongis sinuato-pinnatis, aculeatis, umbellis sessilibus. *Nightshade* with a prickly shrubby stalk, oblong, wing-sinuated, prickly leaves, and umbels sitting close to the stalks. *Solanum Americanum* frutescens, & spinosum, quercus folio, baccis rubris. Houst. MSS. *Shrubby, prickly, American Nightshade*, with an *Oak* leaf and red berries.
17. *SOLANUM* (*Jamaicense*) caule aculeato fruticoso, foliis ovatis tomentosis, anguloso-sinuatis subaculeatis, umbellis sessilibus. *Nightshade* with a prickly shrubby stalk, oval, woolly, angular, sinuated leaves a little prickly, and umbels sitting close to the stalks. *Solanum Americanum* bacciferum, caule & foliis tomentosis incanis spinosis, flore luteo fructu croceo. Sloan. Cat. 108. *Berry-bearing American Nightshade* with hoary stalks and leaves, a yellow flower, and Saffron-coloured fruit.
18. *SOLANUM* (*Fruticosum*) caule aculeato fruticoso, foliis lanceolatis subdentatis glabris, racemis longioribus axillaribus. *Nightshade* with a prickly shrubby stalk, smooth spear-shaped leaves a little indented, and longer bunches of flowers from the wings of the stalk. *Solanum Americanum* fruticosum bacciferum spinosum, flore cæruleo. Sloan. Cat. 108. *Shrubby, berry-bearing, American Nightshade* with a blue flower.
19. *SOLANUM* (*Scandens*) caule inermi frutescente flexuoso, foliis ovatis subtus tomentosis, floribus solitariis alaribus. *Nightshade* with a shrubby, bending, unarmed stalk, oval leaves which are woolly on their under side, and flowers growing singly from the wings of the stalk. *Solanum Americanum*, scandens & frutescens, flore magno cæruleo, fructu rubro. Houst. MSS. *Shrubby, climbing, American Nightshade*, with a large blue flower and a red fruit.
20. *SOLANUM* (*Laurifolium*) caule inermi fruticoso, foliis ovato-acuminatis integerrimis, subtus tomentosis, umbellis erectis alaribus & terminalibus. *Nightshade* with a shrubby unarmed stalk, oval, acute-pointed, entire leaves, which are woolly on their under side, and erect umbels from the wings and the top of the branches. *Solanum Americanum* frutescens, non spinosum, lauri folio, flore racemoso cæruleo. Houst. MSS. *Smooth, shrubby, American Nightshade* with a Bay leaf, and blue flowers growing in clusters.
21. *SOLANUM* (*Carolinense*) caule aculeato fruticoso, foliis ovatis sinuato-dentatis subtus tomentosis, aculeis utrinque rectis, umbellis sessilibus terminalibus. *Nightshade* with a prickly shrubby stalk, oval, sinuated, indented leaves which are woolly on their under side, the spines every way strait, and umbels sitting close at the end of the branches. *Solanum Americanum* frutescens & spinosum, foliis infra tomentosis, flore magno cæruleo. Houst. MSS. *Shrubby and prickly American Nightshade*, with leaves which are hoary underneath, and a large blue flower.
22. *SOLANUM* (*Verbascifolium*) caule inermi fruticoso, foliis ovato-lanceolatis integerrimis subtus tomentosis, umbellis erectis pedunculis longissimis. *Nightshade* with a shrubby unarmed stalk, oval, spear-shaped, entire leaves which are woolly on their under side, and erect umbels having very long foot-stalks. *Solanum Americanum* arborefcens, verbasci folio, fructu flavascente majori. Plum. Cat. 4. *Tree-like American Nightshade* with a *Mullein* leaf, and a larger yellow fruit.
23. *SOLANUM* (*Bonariense*) caule frutescente subinermi, foliis cuneiformibus sinuato repandis. Lin. Sp. Plant. 185. *Nightshade* with a shrubby almost unarmed stalk, and wedge-shaped leaves which are sinuated and turn backward. *Solanum Bonariense* arborefcens, papas floribus.

- floribus. Hort. Elth. 364. *Tree-like Nightshade of Buenos Ayres, with flowers like the Potatoe.*
24. SOLANUM (*Bahamense*) caule frutescente inermi, foliis lanceolatis sinuato-dentatis glabris, umbellis erectis. *Nightshade with a shrubby unarmed stalk, spear-shaped, sinuated, indented, smooth leaves, and erect umbels.* Solanum Bahamense arborefcens, folio sinuato. Hort. Elth. 363. *Tree-like Nightshade from the Bahama Islands, with a sinuated leaf.*
25. SOLANUM (*Sempervirens*) caule inermi fruticoso, foliis integerrimis, pedunculis lateralibus filiformibus. Lin. Sp. Plant. 185. *Nightshade with a shrubby unarmed stalk, oval entire leaves, and thread-like foot-stalks to the flowers, proceeding from the side of the branches.* Solanum lignosum Africanum sempervirens, laurinis foliis. H. Amst. 2. p. 191. *Woody, evergreen, African Nightshade, with Bay leaves.*
26. SOLANUM (*Africanum*) caule inermi frutescente flexuoso, foliis ovatis subdentatis crassis. *Nightshade with a shrubby, flexible, unarmed stalk, and oval thick leaves somewhat indented.* Solanum dulcamarum Africanum, foliis crassis hirsutis. Hort. Elth. 365. *Climbing African Nightshade with hairy thick leaves.*
27. SOLANUM (*Umbellatum*) caule frutescente inermi, foliis lanceolatis integerrimis subtus pilosis, umbellis erectis terminalibus. *Nightshade with a shrubby unarmed stalk, spear-shaped entire leaves which are hairy on their under side, and erect umbels terminating the branches.* Solanum Americanum frutescens non spinosum, foliis oblongis subtus incanis, floribus umbellatis. Houft. *American shrubby Nightshade without thorns, oblong leaves hoary on their under sides, and flowers in umbels.*
28. SOLANUM (*Racemosum*) caule inermi fruticoso, foliis ovato integerrimis, subtus tomentosis, umbellis erectis terminalibus, calycibus obtusis lanuginosis. *Nightshade with a shrubby unarmed stalk, oval entire leaves which are woolly on their under side, erect umbels terminating the branches, and downy obtuse empalements.* Solanum Americanum fruticosum glabrum, foliis subrotundis subtus incanis, floribus racemosis. Houft. MSS. *Smooth, shrubby, American Nightshade with roundish leaves which are hoary on their under side, and branching flowers.*
29. SOLANUM (*Trilobatum*) caule aculeato fruticoso, foliis cuneiformibus subtrilobis glabris obtusis inermibus. Lin. Sp. Plant. 270. *Nightshade with a prickly shrubby stalk, leaves with sinuated indentures, bunches of flowers on the side of the branches, and the spines every where recurved.* Solanum spinosum, Jamaicense glabrum, foliis parvis minus profunde laciniatis. Pluk. Phyt. 316. fig. 5. *Prickly Jamaica Nightshade, whose small leaves are less deeply cut.*
30. SOLANUM (*Virginianum*) caule aculeato herbaceo, foliis pinnatifidis utrinque aculeatis, laciniis sinuatis obtusis, calycibus aculeatis. Lin. Sp. Plant. 267. *Nightshade with a prickly herbaceous stalk, wing-pointed leaves which are armed with spines on both sides, and prickly empalements.* Solanum annuum nigricans Virginianum spinosissimum latè se spargens, flore cæruleo glabrum. Pluk. Phyt. 62. fig. 3. *Black, annual, Virginia Nightshade which is the most prickly, having a blue smooth flower.*
31. SOLANUM (*Mammosum*) caule aculeato herbaceo, foliis cordatis quinquelobis, utrinque villosis aculeatis. Vir. Cliff. 15. *Nightshade with a prickly herbaceous stalk, and heart-shaped leaves with five lobes, which are hairy and prickly on both sides.* Solanum Barbadenfe spinosum annuum, fructu aureo rotundiore pyri parvi inverso forma & magnitudine. Pluk. Phyt. tab. 225. fig. 1. *Annual, prickly, Barbadoes Nightshade, with a rounder golden fruit of the form and size of a small Pear inverted, commonly called Bachelor's Pear.*
32. SOLANUM (*Schiru-schuna*) caule aculeato, foliis pinnato-sinuatis, fructu racemoso. *Nightshade with a prickly stalk, sinuated wing-like leaves, and fruit growing in a long bunch.*

The first sort is now very common upon dunghills, and on rich cultivated soils in many parts of England, where it often becomes a very troublesome

weed. This is the sort which the College of Physicians have directed to be used in medicine, under the title of Solanum hortense: and although it is now become a very troublesome weed in many gardens near London, yet it is not a native of this country, but is supposed to have been brought originally from America, from whence the greater part of the species of this genus have been introduced into Europe.

There are two varieties of this which are found growing naturally in England. The most common sort is an upright branching plant with oval, acute-pointed, smooth leaves, and black berries. The other is a low branching plant with indented leaves, and greenish yellow berries; but whether these are only varieties, or distinct species I cannot say, though I have sown their seeds separately, and have found them keep their difference one year, but do not know if they will continue it always.

The second sort rises with an erect branching stalk three feet high; the leaves are oval, angular, indented, and smooth; the flowers are produced in roundish bunches in form of umbels; they are white, having five star-pointed petals which spread open and are reflexed; in the center are five stamina, which are terminated by oblong yellow summits standing close together; after the flowers are past, the germen swell to round pulpy berries of a yellow colour, having nodding umbels on the side of the branches; the flowers appear in July, and the seeds ripen in autumn. I have several times received the seeds of this sort from Barbadoes, where it is supposed to grow naturally.

The third sort rises with hairy branching stalks two feet and a half high; the leaves are woolly, oval, spear-shaped, acute-pointed, and indented on their edges; the flowers are like those of the former sort, and the berries are of the same size and shape, but are of a red colour; this flowers and ripens its berries at the same time with the former. The seeds of this came from America. The seeds of the fourth sort came from the West-Indies; this hath taller and smoother stalks than either of the former; the leaves are of a dark green and are smooth; they are oval, acute-pointed, and indented on their edges in angular indentures; the flowers are produced in nodding umbels on the side of the branches, which are succeeded by smooth red berries; this flowers at the same time with the former sorts.

The fifth sort grows naturally in Virginia; the stalks of this are angular, and rise upward of three feet high, dividing into a few slender branches, which spread from each other, and are garnished with oval, acute-pointed, smooth leaves, of a deep green colour; they have a few indentures on their edges; the flowers are very small, and there are but few in each umbel; they have narrow acute-pointed petals, white on the inside, and purplish without; they appear in August, and are succeeded by small black berries which ripen late in autumn.

The sixth sort grows naturally in North America. The stalks of this sort rise three feet high, and divide into spreading branches; they are angular, furrowed, and have a few short spines; the leaves are oval and entire; they are six inches long, and five broad, of a dark green colour, and have long foot-stalks; the flowers come out from the side of the branches in small umbels, which nod on one side; they are small, white, and star-pointed, and are succeeded by small black berries which ripen late in autumn.

The seventh sort grows naturally in Guinea. This rises with a strong, thick, herbaceous, angular stalk two feet and a half high, dividing into short thick branches, which are garnished with oblong, oval, smooth leaves, near five inches long, and three and a half broad, which have a few indentures, and stand upon pretty long foot-stalks. The flowers are produced in nodding umbels from the side of the stalk; they are like those of the first sort, but are larger. These are succeeded by large black berries the size

of the common black Cherry, which ripens in autumn.

These seven sorts are annual, so their seeds should be sown in the spring, on a bed of rich earth where the plants are designed to remain, and when they come up they must be thinned, leaving them at least two feet distance, that they may have room to grow, after this they will require no farther care but to keep them clean from weeds; in July and August they will flower, and the seeds will ripen in autumn. Some people plant one or two plants of each sort in pots, whose stalks they train up to sticks to make them strait; and in autumn they remove the pots into the greenhouse, where they may be preserved till the spring, and during the winter, their fruit being ripe, will make a pretty appearance.

The eighth sort is a climbing woody plant, which grows in the hedges in divers parts of England, and is by some planted in gardens, to cover arbours, or shady walls, in London, and other close places, where few other plants will thrive. The cuttings or stalks of this are put into glasses of water, and placed in rooms, where they will put out branches and leaves, and continue a long time green. This plant is also used in medicine for some particular preparations; but the herbfolks in the markets often sell this instead of the Garden Nightshade, which is a cooling plant, and this a hot acrid one, which renders it contrary to the intention of the ointment, wherein Nightshade is one of the ingredients.

There is a sort of this with white flowers, which is supposed to be a variety of the former, but the leaves are woolly, in which it differs from the other, and this is constant. There is also one with variegated leaves, which is preserved by those who are very curious in collecting the various kinds of striped-leaved plants.

These may be easily propagated by laying down their branches, or by planting their cuttings in the spring upon a moist soil, where they will soon take root, and may afterward be transplanted where they are to remain.

The ninth sort grows naturally at the Madeiras; this rises with a strong woody stalk four or five feet high, and divides into many slender stiff branches, which are garnished with spear-shaped leaves turning backward. The flowers grow in small umbels, or singly on the side of the branches, to which they sit close; these are white, with yellow summits, and appear in June, July, and August, and are succeeded by berries as large as small Cherries which ripen in winter, when they make a good appearance in the greenhouse. There are two varieties of this, one with red, and the other has a yellowish fruit.

This plant may be propagated by sowing its seeds in a pot of rich earth in the spring, placing it upon a moderate hot-bed, which will greatly facilitate their growth; the earth in the pot should be frequently watered, for if it is kept too dry the seeds will not grow. When the plants are come up, you should make a gentle hot-bed, which must be covered with rich earth about six inches thick; in this they should be planted about six inches distance each way, and the bed arched over with hoops, &c. and covered with mats, to shade them from the sun and cold, observing frequently to water them.

When the plants have acquired strength, and the season becomes favourable, you must inure them to bear the open air by degrees, to which they should be fully exposed in June, when they should be taken up, with a ball of earth to the root of each plant, and placed separately in pots filled with rich earth, which must be set in a shady situation, and frequently watered until they have taken new root; after which they may be removed into a more open exposure, and placed among other exotic plants, but they require a great plenty of water in dry weather, without which they seldom produce much fruit.

In winter they must be removed into the greenhouse, and placed in the coldest part of the house, where

they may have as much free air as possible in mild weather; being so hardy as many times to endure the cold of our ordinary winters abroad, when planted in a warm situation, so that they only require to be sheltered from severe frost.

These plants should be annually shifted about the latter end of April, when their roots should be pared round, cutting off all the mouldy fibres which were next the pot, and the pots filled up with fresh rich earth, which will strengthen their flowers, and cause them to produce plenty of fruit; which (as I said before) ripens in winter, and being of the shape and size of Cherries, are commonly called Winter Cherries by the gardeners.

The tenth sort grows naturally in the West-Indies; this rises with a shrubby stalk three feet high, dividing at the top into several branches, which are closely armed with strait gold-coloured spines on every side. The leaves are from two to three inches long, and three quarters of an inch broad, having a few angular indentures, and their midrib is armed with a row of the like spines as those upon the stalks, which stand erect. The flowers are produced in long bunches from the side of the stalks; they are white, and of the same size as those of the ninth, which are succeeded by red berries almost as large as the small black Cherry.

The tenth sort is much tenderer than either of the former, being brought from the warm parts of America. This is propagated by sowing the seeds in the spring, upon a good hot-bed; and when the plants are come up, they should be each transplanted into a separate small pot filled with rich earth, and plunged into a fresh hot-bed again, observing to water and shade them until they have taken root; after which, they should have air and water in proportion to the heat of the season, and the bed in which they are placed; and when their roots have filled the pots in which they were planted (which they will do in two months time, if they thrive) they must be shaken out, and after having gently pared off the fibres which grew next the pot, they should be planted into pots of a size larger, which must be filled with fresh rich earth, and plunged into a fresh hot-bed to bring the plants forward, observing to water them frequently, for they will not thrive without plenty of moisture in warm weather.

In July these plants may be inured to bear the open air by degrees, into which they may be removed if the season be warm; but otherwise they must always be preserved either under glasses, or in the stove; and if they are placed in the open air, they should not remain there longer than the middle or latter end of August, lest the nights growing cold, should hurt them. During the winter season they must be preserved in the stove, observing to refresh them frequently with water, but they must not have too much each time, especially in cold weather. The second year they will produce flowers and fruit.

The eleventh sort has a shrubby stalk which rises two feet high, and divides into several woody branches which are armed with sharp thorns, and garnished with oval woolly leaves which have angular indentures on their edges; they are an inch and a half long, and more than an inch broad. The flowers are produced in loose small bunches from the wings of the stalks; they are blue, and larger than those of the former sorts; these appear in June and July, and are succeeded by round berries as large as common Cherries, of a gold colour, which turn black when ripe.

The twelfth sort grows naturally at the Cape of Good Hope; this hath a strong, thick, shrubby stalk, which rises from two to three feet high, sending out many short thick branches, which are closely armed with short, strong, yellow spines on every side; the leaves are about four inches long, and two broad; they are cut almost to their midrib in obtuse segments which are opposite, regular, and formed like winged leaves; these segments have several obtuse indentures on their edges;

edges; they are of a dark green colour, and are armed with the same sort of spines as those on the stalks, on both sides. The flowers come out in small bunches on the side of the branches; they are blue, and larger than those of the former sort; these appear in June and July, and are succeeded by round yellow berries as large as Walnuts, which ripen in winter.

The eleventh and twelfth sorts are not so tender as the tenth, but require an open airy glass-case, or a warm green-house in winter, but in summer may be exposed in the open air with other exotic plants. These may be propagated by sowing their seeds on a hot-bed as the former, and should be managed as hath been directed for them; with this difference, that they may be much sooner exposed to the air, and should not be bred so tenderly. These are preserved for their odd appearance, by such as are curious in cultivating exotic plants; their fruits being ripe in winter, afford a variety in the green-house, and their leaves and flowers being very remarkable in their colour, shape, &c. render them worthy of a place in every good collection of plants.

The thirteenth sort hath a shrubby stalk which rises two or three feet high, sending out several ligneous branches, which are armed with short, strong, yellowish spines; the leaves are an inch and a half long, and an inch broad, woolly on both sides, and are angularly indented. These are armed with spines on both sides, in a row on the midrib. The flowers come out in longish bunches from the side of the stalks; they are blue, and like those of the twelfth; they appear in June and July, and are succeeded by round berries of a gold colour as large as Cherries, which ripen in winter.

The fourteenth sort was discovered by the late Dr. Houstoun at La Vera Cruz in New Spain, growing naturally there, from whence he sent the seeds to England, which succeeded in the Chelsea Garden. This rises with a prickly herbaceous stalk near two feet high, dividing into two or three branches, which are closely armed with slender yellow spines of unequal lengths. The leaves are six inches long, and three inches and a half broad, of a bright green colour, and deeply sinuated; the veins of the leaves are armed with yellow erect spines on both sides. The umbels of flowers stand erect at the end of the branches; the flowers are very large, and of a fine blue colour; these are succeeded by round berries as large as common Cherries, which are marbled with white and green. The empalement of the flower is armed with spines like a hedge-hog. It flowers in July and August, but the fruit ripens late in the autumn, so that unless the plants are brought forward in the spring, they will not produce ripe seeds in England.

The fifteenth sort grows naturally at La Vera Cruz in New Spain, where the late Dr. Houstoun discovered it. This hath shrubby trailing stalks two feet long, which are armed with long yellow spines, and covered with a gray bark; the leaves are near four inches long, and almost two broad, very finely cut in form of winged leaves almost to their midrib; they are woolly, and armed with long, slender, yellowish spines on their veins on both sides. The foot-stalks of the flowers arise from the wings of the stalks; they are two or three inches long, each for the most part sustaining two large yellow flowers, having very prickly empalements; these are succeeded by small round berries the size of gray Peas, which are marbled with green and white.

The sixteenth sort was discovered by the late Dr. Houstoun, growing at La Vera Cruz; this rises with a shrubby stalk five or six feet high, armed with short recurved spines, and covered with a smooth brownish bark, garnished with oblong leaves six inches long, and two and a half broad, which are regularly sinuated on both edges in form of winged leaves; these rise by two or three from the same point, and stand erect; they are armed with a few short spines along the mid-

rib on both sides. The flowers come out in small loose bunches from the side of the branches, to which they fit close; these are but small; they have five white star-pointed petals, and are succeeded by small berries about the size of those of Juniper, which, when ripe, are red.

The seventeenth sort grows naturally in Jamaica; this rises with a shrubby woolly stalk five or six feet high, armed with short recurved thorns, and garnished with oval woolly leaves six inches long, and four broad, which are angularly sinuated, and have a very few short crooked spines upon the midrib on the under side. The flowers are in small umbels fitting close to the side of the branches; they are small and yellow; these are succeeded by small round berries of a Saffron colour when ripe.

The eighteenth sort grows naturally in Jamaica; this rises with shrubby stalks three or four feet high, dividing into several irregular branches which have a gray bark, and are armed on every side with slender erect spines of a gray colour. The leaves are spear-shaped, an inch and a half long, and half an inch broad; they are smooth, and a little indented or waved on their edges. The flowers come out in long bunches from the side of the stalk, standing upon long foot-stalks; they are of a fine blue colour, and are succeeded by Saffron-coloured berries the size of Peas.

The nineteenth sort was discovered by the late Dr. William Houstoun, growing naturally at La Vera Cruz; this hath a shrubby climbing stalk which rises ten or twelve feet high, covered with a smooth brown bark, and divides into several branches. The leaves are oval, woolly on their under side, but of a dark green on their upper; they are two inches long, and one and a half broad. The flowers come out singly from the wings of the stalk; they are large, of a fine blue colour, and the petal is not divided into segments like those of the other species, but it hath five angles, each ending in a point; these are succeeded by round berries about the size of gray Peas, which are red when ripe.

The twentieth sort was discovered by the late Dr. Houstoun at Campeachy; this rises with a smooth shrubby stalk six or seven feet high, sending out ligneous branches on every side, which have a smooth brown bark, and are garnished with oval acute-pointed leaves which are entire, and woolly on their under side; they are four inches long, and two and a half broad. The flowers are collected into umbels which stand erect; these come out from the side and at the end of the branches; they are of a light blue colour, and are succeeded by round berries the size of small black Cherries, which are yellow when ripe.

The twenty-first sort was discovered by the late Dr. Houstoun at La Vera Cruz; this hath a shrubby stalk which rises four feet high, having a white downy bark, and armed on every side with trait brown spines. The leaves stand three inches asunder; they are oval, and have sinuated indentures; they are two inches long, and one and a quarter broad, woolly on their under side, and have prickly foot-stalks. Their midrib is armed with two or three small spines, sometimes on both sides, and at others but on one. The spines are all erect; the flowers are disposed in an umbel fitting close at the end of the branches; they are large, of a fine blue colour, and have woolly empalements; these are succeeded by round berries the size of large Peas, which are red when ripe.

The twenty-second sort grows naturally at Campeachy; this rises with a woody stalk eight or ten feet high, sending out several ligneous branches which are covered with a gray down, and are furrowed. The leaves are sometimes placed alternately on the branches, and at others are opposite, standing upon pretty long thick foot-stalks; they are seven inches long, and three and a half broad; their edges are entire, and end in acute points, and are woolly on their under side. The flowers terminate the branches in large erect umbels, standing upon long foot-stalks; they

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are large, white, and have woolly empalements; these are succeeded by berries the size of Cherries, which turn yellow.

The ten last mentioned sorts are propagated by seeds in the same manner as the former, but these being natives of warm countries, must be raised on a hot-bed early in the spring; and when the plants are fit to remove, they must be each planted in a separate small pot filled with fresh rich earth, and plunged into a moderate hot-bed of tanners bark, observing to shade them from the sun until they have taken new root; after which time they should have a large share of fresh air admitted to them in warm weather, and must be frequently watered. Toward the latter end of June it will be proper to harden the plants gradually, and soon after they should be removed into the stove, where they must have as much free air as possible in warm weather, but as the cold approaches in autumn, they must be carefully protected therefrom, and in winter they should be kept in a moderate temperature of warmth, otherwise they will not live in this country.

Some of these sorts will bear to be exposed in the open air in the heat of summer, provided they are placed in a warm situation; but if the season should prove cold, they will not thrive abroad, wherefore it will be better to let them remain in the stove, and open the glasses in front, and at the top of the stove, every day, to admit as much air as possible in hot weather, with which management they will thrive much better than in the open air.

The twenty-third sort grows naturally at Buenos Ayres in the Spanish West-Indies; this rises with a woody stalk ten or twelve feet high, covered with a purplish bark almost smooth. At the top it divides into several branches which grow erect, and are garnished with wedge-shaped leaves which are sinuated. The flowers are produced in large umbels at the end of the branches; they are large, white, and the petal is angular, but not divided at the brim; these appear in July, and are succeeded by small berries which change yellow when they are ripe.

The seeds of the twenty-fourth sort were sent from the Bahama Islands by Mr. Catesby; this rises with a smooth shrubby stalk six or eight feet high, covered with a brown bark, and divides into many branches, which are garnished with spear-shaped leaves three inches and a half long, and one and a half broad; they have a few sinuated indentures on their edges, and end in acute points; they are smooth, and of a light green colour. The flowers are produced in small umbels from the side of the stalks, standing erect; they are pretty large, white, and have their petals cut into five star-pointed segments; these are very rarely succeeded by seeds in England.

The two last mentioned sorts are not so tender as the ten former sorts, so may be treated in the same way as the eleventh and twelfth, by housing them in winter with Oranges and other green-house plants, and in summer place them abroad in a sheltered situation; they may be propagated by cuttings, which, if planted in a shady border during any of the summer months, will take root pretty freely, and may then be taken up and potted, placing them in the shade till they have taken new root, and then they may be treated in the same way as the old plants.

The twenty-fifth sort grows naturally on the coast of Guinea; this has a shrubby stalk which rises seven or eight feet high, dividing into many branches which have a smooth bark. The lower leaves are oblong, oval, about three inches long, and one and a half broad, smooth, of a dark green colour, and stand upon short foot-stalks; the flowers come out from the side of the branches in small bunches, standing upon very slender foot-stalks; they are of the same shape and colour with those of the *Amomum Plinii*, but are smaller; these are sometimes succeeded by berries about the size of small black Cherries, which are yellow when ripe.

This sort requires a stove in winter, and must not be

exposed abroad longer than ten or twelve weeks in the warmest part of summer; it may be propagated by cuttings, which, when planted, must be closely covered with a bell or hand-glass, and shaded from the sun, treating them in the same manner as other cuttings of exotic plants.

The twenty-sixth sort grows naturally at the Cape of Good Hope; this has shrubby flexible stalks, requiring support like our common woody Nightshade, to which the plant has great resemblance, but the leaves are shorter, thicker, and are more indented on their edges: this sort very rarely flowers in England. There are some who have supposed this and our common woody Nightshade to be the same, which is certainly a great mistake, for this sort will not live abroad through the winter in England in any situation, nor does it produce flowers here with any treatment, for there are plants in the Chelsea Garden of several years old, which have been differently managed, and yet have never flowered.

It may be easily propagated by cuttings during any of the summer months, and may be preserved in a green-house in winter, treating it in the same way as the *Amomum Plinii*.

The twenty-seventh sort was discovered by the late Dr. Houstoun at Campeachy; this rises with a woody stalk ten or twelve feet high, sending out many branches which have a light gray bark, and are smooth. The leaves are spear-shaped, five inches long, and one and a half broad in the middle, drawing to a point at both ends; they are of a deep green on their upper side, but are hoary on their under. The flowers are produced in large umbels at the end of the branches; they are small, star-pointed, and white; their summits, which fill up the mouth of the tube, are purple; these are succeeded by small berries the size of middling Peas, which are yellow when ripe.

The twenty-eighth sort was discovered at Carthage in New Spain, by the gentleman before-mentioned; this rises with a shrubby stalk, having a light brown bark, which divides into several irregular ligneous branches; these are garnished with oval leaves four inches long, and two and a half broad, smooth, of a dark green on their upper side, but woolly on their under. The flowers are produced in large erect umbels at the end of the branches, which are pretty large, and white, shaped like those of the other sorts; these are succeeded by round berries the size of small Cherries, sitting in the blunt woolly empalement of the flower, which turn yellow when ripe.

The twenty-ninth sort grows naturally in Jamaica, and also at the Cape of Good Hope: this rises with a shrubby prickly stalk five or six feet high, sending out a few branches toward the top, garnished with obtuse leaves which are smooth, and divided into three lobes; the flowers are small, which are succeeded by small berries which rarely ripen in England.

The thirtieth sort grows naturally in Virginia; this is an annual plant, rising with a shrubby prickly stalk about three feet high, sending out a few slender branches, garnished with wing-pointed leaves; the flowers are large, blue, and have prickly empalements; they are succeeded by berries almost the size of black Cherries. If the plants of this sort are brought forward on a hot-bed early in the spring, they will ripen their seeds, otherwise they never produce good seeds in England.

The thirty-first sort grows common in all the West-India islands, where it is called Batchelor's Pear. This rises with a prickly herbaceous stalk three or four feet high; the spines are strong and crooked; the leaves are large, angular, and woolly, and are armed with the like spines; the flowers are produced in bunches from the side of the stalks; they are of a pale blue colour, and are succeeded by yellow fruit the shape and size of a Catharine Pear, but they are inverted. The plant is annual here.

The thirty-second sort grows naturally on the coast of Malabar; this is an annual plant, rising with a prickly stalk

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stalk near two feet high, sending out a few branches without order, garnished with oblong leaves which are indented like winged leaves; the flowers are produced in long bunches from the side of the stalks; they are small, white, and are succeeded by red berries the size of small Cherries, which ripen in the autumn.

The seeds of these should be sown the beginning of March upon a hot-bed, and when the plants are fit to remove, they should be planted in separate small pots filled with rich earth, and plunged into a new hot-bed to bring them forward, otherwise they will not ripen their seeds in England.

SOLDANELLA A. Tourn. Inst. R. H. 82. tab. 16. Lin. Gen. Plant. 182. Soldanel.

The CHARACTERS are,

The flower has an erect permanent empalement cut into five parts; it has one bell-shaped petal spreading open gradually. The brim is cut into acute segments; it has five awl-shaped stamina terminated by single summits, and a roundish germen supporting a slender style the length of the petal, which is permanent, and crowned by an obtuse stigma. The germen afterward turns to an oblong taper capsule of one cell, obliquely streaked, and opening at the top with ten indentures, filled with small acute-pointed seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one style.

We have but one SPECIES of this genus, viz.

SOLDANELLA (*Alpina*.) Hort. Cliff. 49. Soldanel. Soldanella Alpina rotundifolia. C. B. P. 295. Round-leaved Soldanel of the Alps.

This plant grows naturally on the Alps, and other mountains in Germany. The root is fibrous and perennial; the leaves are almost kidney-shaped; they are about three quarters of an inch over each way, of a dark green colour, and stand upon long foot-stalks. Between these arise the foot-stalk of the flower which is naked, about four inches long, sustaining at the top two small open bell-shaped flowers, whose brim is cut into many fine segments like a fringe; the most frequent colour of the flower is blue, but it is sometimes found with a snow-white flower. After the flower is past, the germen becomes an oval capsule, with the style coming out at the top, filled with very small acute-pointed seeds. It flowers in April, and the seeds ripen in July.

There is another variety of this whose leaves are less round.

The best method to propagate these plants is by parting their roots, because their seeds seldom ripen well in England; nor do the seeds, which are brought from abroad succeed, for they seldom grow unless they are sown soon after they are ripe.

The season for transplanting and parting these roots is in September, that they may have time to make good roots before winter; for if they are removed in the spring, they never flower very strong: and if the season should prove dry, the plants will decay, unless they are constantly supplied with water.

The soil in which these plants thrive best, is a strong cool loam, and they must have a shady situation; for if they are exposed to the sun they will not live, nor will they thrive in a warm light soil. In dry weather these plants should be frequently watered, which will cause them to flower strongly and make a good increase.

If the seeds ripen in England, and any person is desirous to propagate the plants that way, they should be sown in boxes or pots filled with fresh loamy earth soon after they are ripe, and the boxes must be placed in a shady situation, and frequently watered in dry weather. The plants will sometimes appear the same autumn the seeds are sown, but more frequently they do not come up till the following spring, so that the earth must not be disturbed, nor weeds permitted to grow in the boxes. When the plants come up, they must be duly watered in dry weather, and constantly placed in a shady situation. The following autumn the plants should be taken out of the boxes,

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and planted in a shady border about six or eight inches asunder, where they may remain to flower; or they may be intermixed with other low Alpine plants in north borders, where they will make an agreeable variety.

SOLIDAGO. Lin. Gen. Plant. 859. Virga aurea. Tourn. Inst. R. H. 483. tab. 735. Golden Rod, or Saracens Woundwort; in French, *Verge dorée*.

The CHARACTERS are,

It has a compound flower, made up of hermaphrodite florets and female half florets, inclosed in one oblong imbricated empalement, whose spikes are narrow, and join together. The hermaphrodite flowers which compose the disk, are funnel-shaped, and cut into five points at the brim, which spread open; they have five very short hair-like stamina terminated by cylindrical summits, and a crowned germen supporting a slender style as long as the stamina, crowned by a bifid open stigma. The germen afterward turns to a single seed crowned with hairy down. The female half florets are tongue-shaped, and indented in three parts; these have a crowned germen, with a slender style crowned by two revolving stigmas, and are succeeded by a single seed like the hermaphrodite florets.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which includes those plants whose flowers are composed of hermaphrodite and female florets which are all fruitful, and the stamina and style are connected.

The SPECIES are,

1. SOLIDAGO (*Latifolia*) caule erecto foliis lanceolatis serratis, paniculis corymbosis, lateralibus terminalibusque. *Woundwort with an erect stalk, spear-shaped sawed leaves, and flowers in a corymbus on the side and at the top of the stalk.* Virga aurea latifolia serrata. C. B. P. 268. Broad-leaved sawed Golden Rod.
2. SOLIDAGO (*Vulgaris*) caule subflexuoso angulato, racemis paniculatis erectis confertis. Lin. Sp. Plant. 880. *Woundwort with an angular almost flexible stalk, and erect bunches of flowers in panicles close together.* Virga aurea vulgaris. Park. Theat. 542. Our common Golden Rod.
3. SOLIDAGO (*Angustifolia*) foliis lineari-lanceolatis subintegerrimis, floribus confertis alaribus sessilibus. *Woundwort with linear spear-shaped leaves almost entire, and flowers in clusters sitting close at the wings of the stalk.* Virga aurea angustifolia minus serrata. C. B. P. 268. Narrow-leaved Golden Rod less sawed.
4. SOLIDAGO (*Minor*) caule paniculato, foliis radicalibus ovatis dentatis, caulinis lanceolatis integerrimis. *Woundwort with a paniced stalk, the bottom leaves oval and indented, those on the stalks spear-shaped and entire.* Virga aurea minor, foliis serratis utrinque acuminatis. Rand. Smaller Golden Rod, with sawed leaves pointed at both ends.
5. SOLIDAGO (*Minuta*) foliis lineari-lanceolatis subferratis subtus incanis floribus paniculatis confertis. *Woundwort with linear spear-shaped leaves slightly sawed, hoary on their under side, and paniced flowers in clusters.* Virga aurea montana, folio angusto subincano, hoiculis conglobatis. Raii Syn. 177. Mountain Golden Rod with narrow leaves hoary on their under side, and flowers in round clusters.
6. SOLIDAGO (*Montana*) foliis lanceolatis ferratis decurrentibus, caule angulato. Le Monier. Sauv. Monsp. 84. *Woundwort with spear-shaped, sawed, running leaves, and an angular stalk.* Virga aurea montana, latiore folio hirsuto. H. R. Par. Mountain Golden Rod with a broader hairy leaf.
7. SOLIDAGO (*Canadensis*) paniculato-corymbosa, racemis recurvatis, floribus adscendentibus, foliis trinerviis subferratis scabris. Hort. Upsal. 259. *Woundwort with corymbus panicles, recurved spikes of flowers rising above each other, and rough leaves having three veins which are slightly sawed.* Virga aurea angustifolia, panicula speciosa Canadensis. H. R. Par. Narrow-leaved Canada Golden Rod, with a fine panicle of flowers.
8. SOLIDAGO (*Altissima*) paniculata-corymbosa, racemis recurvatis, floribus adscendentibus, foliis enerviis subintegerrimis. Hort. Upsal. 259. *Woundwort with a corymbus panicle, recurved spikes of flowers rising above each*

- each other, and leaves without veins almost entire. Virga aurea altissima ferotinâ, paniculâ, speciosâ patulâ. Martyn. Cent. 1. 14. Tallest late Golden Rod, with a spreading panicle.
9. SOLIDAGO (*Pilosa*) caule piloso, foliis lanceolatis ferratis scabris sessilibus, racemis recurvatis alaribus, floribus pedunculatis. *Woundwort with a hairy stalk, spear-shaped, sawed, rough leaves sitting close to the stalks, recurved spikes, and flowers upon foot-stalks.* Virga aurea Canadensis hirsuta, paniculâ minus speciosa. Hort. R. Par. *Hairy Canada Golden Rod, with a less beautiful panicle.*
10. SOLIDAGO (*Marylandica*) paniculato-corymboso, racemis obtusis patulis, foliis nervosis scabris subintegerrimis. *Woundwort with a corymbus panicle, obtuse spreading spikes, and rough veined leaves almost entire.* Virga aurea Marylandica, spicis florum racemosis, foliis integris scabris. Mart. Dec. 2. *Maryland Golden Rod, with flowers in long bunches and rough entire leaves.*
11. SOLIDAGO (*Virginiana*) paniculato-corymbosa, racemis longissimis recurvatis, pedunculis foliosis, foliis lanceolatis ferratis scabris. *Woundwort with a corymbus panicle, very long recurved spikes whose foot-stalks are leafy, rough, sawed, spear-shaped leaves.* Virga aurea rugosis foliis Virginiana, paniculâ florum amplissimâ. Pluk. Alm. 390. *Virginia Golden Rod with rough leaves, and an ample panicle of flowers.*
12. SOLIDAGO (*Scrophularifolia*) caule flexuoso, foliis ovatis acuminatis ferratis, racemis lateralibus simplicibus. Flor. Leyd. Prod. 161. *Woundwort with a flexible stalk, oval, acute-pointed, sawed leaves, and single spikes of flowers at the wings of the stalk.* Virga aurea Canadensis, scrophulariæ folio. Pluk. Phyt. 235. *Canada Golden Rod with a Figwort leaf.*
13. SOLIDAGO (*Flexicaulis*) caule flexuoso glabro, foliis ovato-lanceolatis glabris dentatis, racemis brevioribus lateralibus simplicibus. *Woundwort with a smooth flexible stalk, oval, spear-shaped, smooth leaves which are indented, and shorter single spikes of flowers at the wings of the stalk.* Virga aurea Canadensis asterisci folio. Par. Bat. *Canada Golden Rod with a leaf of Asteriscus.*
14. SOLIDAGO (*Latissimifolia*) caule erecto glabro, racemis brevioribus lateralibus, foliis nervosis ferratis glabris. *Woundwort with a smooth erect stalk, shorter erect spikes of flowers at the wings of the stalk, and smooth, veined, sawed leaves.* Virga aurea Canadensis, latissimo folio glabro. Tourn. Inst. 485. *Canada Golden Rod with the broadest smooth leaf.*
15. SOLIDAGO (*Hirsutissimis*) paniculato-corymbosa, racemis recurvatis, caulibus erectis hirsutissimis, foliis lanceolatis ferratis acuminatis trinerviis subtus tomentosis. *Woundwort with a corymbus panicle, recurved spikes, very hairy erect stalks, and spear-shaped, sawed, acute-pointed leaves with three veins, woolly on their under side.* Virga aurea Canadensis, altissima, folio subtus incano. Tourn. Inst. 485. *Tallest Canada Golden Rod, with a leaf which is hoary on the under side.*
16. SOLIDAGO (*Humilis*) paniculato-corymbosa, racemis compositis recurvatis, foliis linearilanceolatis subdentatis sessilibus. *Woundwort with a corymbus panicle, compound recurved spikes, and linear spear-shaped leaves slightly indented, sitting close to the stalks.* Virga aurea humilis, foliis rigidis utrinque acuminatis paniculâ speciosâ. Rand. *Low Golden Rod with stiff leaves pointed at both ends, and a specious panicle of flowers.*
17. SOLIDAGO (*Rigida*) caule paniculato, foliis inferioribus ovatis dentatis, petiolis longissimis, superioribus lanceolatis semiamplexicaulibus. *Woundwort with a paniculated stalk, the lower leaves oval and indented, the upper spear-shaped, half embracing the stalk.* Virga aurea Novæ Angliæ, lato rigidoque folio. Par. Bat. *New-England Golden Rod with a broad and stiff leaf.*
18. SOLIDAGO (*Mexicana*) caule obliquo, pedunculis erectis foliatis ramosis, foliis lanceolatis integerrimis. Hort. Cliff. 409. *Woundwort with an oblique stalk, branching, erect, leafy foot-stalks, and spear-shaped entire leaves.* Virga aurea Limonii folio, panicula uno versu disposita. Tourn. Inst. 484. *Golden Rod with a Sea Lavender leaf, and a panicle of flowers disposed on one side of the stalk.*
19. SOLIDAGO (*Fistulosa*) caule piloso ramoso, racemis paniculatis erectis confertis, foliis hirsutis sessilibus integerrimis. *Woundwort with a hairy branching stalk, erect spikes of flowers in a panicle, and hairy entire leaves sitting close to the stalk.* Virga aurea, floribus fistulosis senecionis instar, foliis angustioribus non ferratis. Hist. Oxon. 3. p. 125. *Golden Rod with fistular flowers like Groundsel, and narrow leaves not sawed.*
20. SOLIDAGO (*Carnosa*) foliis lanceolatis subcarnosis glaberrimis, margine scabriusculis, panicula corymbosa. Lin. Sp. Plant. 878. *Woundwort with spear-shaped leaves almost fleshy, and very smooth, with rough edges, and a corymbus panicle.* Virga aurea Canadensis, foliis carnosius latoribus. Hist. Oxon. 3. p. 124. *Canada Golden Rod with broad fleshy leaves.*
21. SOLIDAGO (*Cæsia*) panicula corymbosa, racemis supra densioribus, caule glabro lævi. Lin. Sp. Plant. 879. *Woundwort with a corymbus panicle, the spikes growing closer toward the top, and a smooth stalk.* Virga aurea Marylandica cæsia glabra. Hort. Elth. 414. *Smooth Maryland Golden Rod.*
22. SOLIDAGO (*Glabra*) foliis lanceolato-linearibus subcarnosis glaberrimis, panicula corymbosa. *Woundwort with narrow, fleshy, very smooth leaves, and a corymbus panicle.* Virga aurea Canadensis, foliis carnosius angustioribus non ferratis. Hist. Oxon. 3. p. 125. *Canada Golden Rod with fleshy leaves not sawed.*
23. SOLIDAGO (*Novaboracensis*) panicula corymbosa, foliis linearibus glaberrimis sessilibus. *Woundwort with a corymbus panicle, and linear very smooth leaves sitting close to the stalks.* Virga aurea Novaboracensis glabra, caulibus rubentibus foliis angustis glabris. Herm. Flor. 26. *Smooth Golden Rod of New-York, with reddish stalks and narrow smooth leaves.*
24. SOLIDAGO (*Integerrima*) caule paniculato racemis brevioribus confertis, foliis linearibus glabris integerrimis. *Woundwort with a paniculated stalk, shorter spikes of flowers in clusters, and narrow, smooth, entire leaves.* Virga aurea Canadensis, angustifolia non ferrata. Houst. *Narrow-leaved Canada Golden Rod, with leaves not sawed.*
25. SOLIDAGO (*Rugosa*) caule paniculato racemis lateralibus simplicibus pedunculis foliatis foliis lanceolatis scabris integerrimis. *Woundwort with a paniculated stalk, single spikes of flowers from the wings of the stalk, having leafy foot-stalks, and rough, spear-shaped, entire leaves.*
26. SOLIDAGO (*Alba*) caule paniculato racemis erectis pedunculis foliatis, inferioribus ovatis ferratis nervosis, caulibus lanceolatis integerrimis. *Woundwort with a paniculated stalk, erect spikes of flowers with leafy foot-stalks, the lower leaves oval, sawed, and veined, but those on the stalks spear-shaped and entire.* An? Virga aurea foliis latoribus, floribus in summis virgis albis, spicatum dense dispositis. Clayt. Flor. Virg. 97. *Broad-leaved Golden Rod, with white flowers at the top of the branches disposed in close spikes.*
27. SOLIDAGO (*Conferta*) caule paniculato racemis inferioribus simplicibus, summis confertissimis, foliis glabris integerrimis. *Woundwort with a paniculated stalk, the lower spikes simple, those at the top in very close clusters, and entire smooth leaves.*
28. SOLIDAGO (*Recurvata*) paniculata corymbosa, racemis inferioribus recurvatis, summis erectis confertis, foliis lanceolatis ferratis scabris. *Woundwort with a corymbus panicle, the lower spikes recurved, the upper erect in clusters, and spear-shaped, sawed, rough leaves.*
29. SOLIDAGO (*Petiolata*) caule paniculato, racemis confertis, foliis inferioribus linearilanceolatis petiolatis, caulibus sessilibus glabris. *Woundwort with a paniculated stalk, clustered spikes of flowers, the lower leaves linear, spear-shaped on foot-stalks, and those on the stalks smooth, sitting close.*
30. SOLIDAGO (*Urticifolia*) caule rotundo piloso, foliis ovato lanceolatis crenatis oppositis scabris, racemis brevissimis lateralibus. *Woundwort with a round hairy stalk, oval, spear-shaped, crenated, rough leaves, standing opposite, and very short spikes of flowers at the wings of the stalk.* Virga aurea Americana, urticæ foliis conjugatis rugosis & hirsutis, florum spicis foliosis. Houst.

Houft. MSS. *American Golden Rod with Nettle leaves by pairs which are rough and hairy, and spikes of flowers between the leaves.*

31. *SOLIDAGO (Fruticosa) caule fruticoso, foliis lanceolatis glabris integerrimis, floribus corymbosis terminalibus. Woundwort with a shrubby stalk, spear-shaped, smooth, entire leaves, and flowers in a corymbus terminating the stalks. Virga aurea Americana, fruticosa, Salicis folio, floribus quasi umbellatis. Houft. MSS. Shrubby American Golden Rod with a Sallow leaf, and flowers as it were in umbels.*

The first sort is not common in England, though that which grows naturally about London is generally taken for it. This grows plentifully about Brabant, and is the most common in Germany. The stalks of this are stiff, of a purplish brown colour, and rise about two feet high. The panicles of flowers come out from the wings, and at the top of the stalks, each flower standing upon a long slender foot-stalk; they are of a pale yellow colour, and appear the beginning of August. The leaves are spear-shaped almost four inches long, and a quarter broad, deeply sawed on their edges, and are of a pale green on their under side. The second sort is our common Golden Rod about London; the lower leaves of this are oval, spear-shaped, about two inches long, and one broad; they are slightly sawed on their edges, and have pretty long foot-stalks; the stalks are slender, about a foot and a half high, garnished with small, narrow, entire leaves, having no foot-stalks. The flowers are produced in panicked bunches, which are clustered together, forming a thick erect spike; they are yellow, and appear in August and September.

The third sort is frequently found growing naturally in several parts of England; I have often gathered it in the woods near Dulwich in Surry; the stalk is round, smooth, rises a foot and a half high, garnished with narrow spear-shaped leaves about an inch and a quarter long, and an eighth of an inch broad; they are almost entire, and sit close to the stalk. The flowers come out in small clustered bunches at the wings of the stalk, to which they fit very close, and the stalk is terminated by a roundish bunch: as the flowers of this are produced at every joint, the upper half of the stalk, the spikes being short, they do not make so good an appearance as those of the second. It flowers about the same time.

The fourth sort grows naturally in the woods at Hampstead, from whence I have several times taken the roots, and planted them in the garden, where they have continued many years, and have never varied; the lower leaves of this are indented; the stalk seldom rises more than a foot high, branching out almost from the bottom. The branches are terminated by short clustered spikes of yellow flowers which are erect; the leaves on the stalk and branches are very narrow, acute-pointed, and entire.

The fifth sort grows naturally on the mountains in Wales; the lower leaves of this are narrow, spear-shaped, an inch and a half long, and a quarter broad; they are smooth, slightly sawed on their edges, and a little hoary on their under side; the stalk rises about six inches high, it is garnished with the same sort of leaves with those below, but smaller. The flowers grow in roundish clustered spikes at the top of the stalk, which are much larger than those of the common sort, and appear five or six weeks earlier in the season.

The sixth sort grows naturally upon the mountains in the south of France and Italy; the stalk is angular, and has narrow leafy borders; it rises about two feet high; the leaves are spear-shaped, acute-pointed, and sawed; they are three inches long, and one broad, of a pale green on their under side, and hairy; the flowers come out in close thick spikes from the wings of the stalks more than half the length, terminating the stalk in a thick spike; they are yellow, and appear in July.

The seventh sort grows naturally in North America; the stalks are round, smooth, and rise two feet high; they are garnished with narrow rough leaves, having three longitudinal veins; they are two inches and a

half long, and a quarter of an inch broad in the middle, ending in acute points fitting close to the stalks, and have sometimes a few slight serratures on their edges. The flowers are gathered in a roundish panicle at the top of the stalk; the lower spikes of flowers are reflexed, but those at the top stand erect, and are joined very close; these are yellow, and appear in July.

The eighth sort grows naturally in North America; the stalks of this are round and smooth; they rise upward of four feet high; the leaves are rough, acute-pointed, and have no veins; they stand closer together on the stalks, and are shorter and broader than those of the seventh; the panicles of flowers are much larger, the spikes much longer, they spread out wider, and are more reflexed. This flowers late in August and September.

The ninth sort grows naturally in North America; the stalks of this are round and hairy; they rise near three feet high, and are closely garnished with rough spear-shaped leaves two inches long, and half an inch broad, slightly sawed on their edges, and sit close to the stalks. The flowers come out from the wings, at the upper part of the stalk, in long recurved spikes; they are small, of a sulphur colour, and stand upon short foot-stalks. This sort flowers the end of July.

The tenth sort grows naturally in North America; the stalks are round, smooth, and rise four or five feet high; they are garnished with rough spear-shaped leaves two inches and a half long, and half an inch broad; they are entire, and sit close to the stalks; the flowers are produced in roundish panicles at the top of the stalks, which are composed of obtuse spreading spikes in close clusters. The flowers are yellow, and appear in August.

The eleventh sort grows naturally in Virginia; the stalks are round, channelled, and rise two feet high; the leaves are rough, acute-pointed, and sawed; they are two inches and a half long, and one broad. The flowers are produced in a panicle at the top of the stalk; the spikes are very long, recurved, and spread out on every side; the lower parts of the foot-stalks are closely furnished with small leaves, and the flowers are in close clusters at the end of the spike; they are of a bright yellow colour, and appear late in September.

The twelfth sort grows naturally in North America; the stalks are slender, smooth, and rise two feet high; they are garnished with oval, acute-pointed, sawed leaves three inches long, and two broad, and stand alternately at two inches distance. The flowers come out in long bunches from the wings of the stalks; they are disposed loosely on the foot-stalk, and are of a pale yellow colour; these appear in August, and continue part of September.

The thirteenth sort grows naturally in North America; the lower leaves are four inches long, and almost two broad; their foot-stalks are two inches long, and have a membrane or wing on each side. The stalks rise two feet high; they are slender, smooth, and of a light purple colour, and garnished with oval, spear-shaped, indented leaves, near two inches long, and three quarters of an inch broad, of a pale green on their under side. The flowers are produced in short bunches from the wings of the stalk, almost the whole length; the lower spikes are an inch long, but those on the upper part of the stalks are almost round; the flowers are of a brimstone colour, and appear late in August.

The fourteenth sort grows naturally in Canada; the stalks of this are stiff, round, smooth, and have a white bark; they rise upward of three feet high, and are garnished with smooth spear-shaped leaves, having several veins; they are three inches and a half long, and one inch broad, standing alternately. The flowers come out toward the top of the stalk, from the wings, in short spikes, which stand erect and are obtuse; they are of a pale yellow colour, and appear in August.

The fifteenth sort grows naturally in Canada; this rises with a strong hairy stalk five or six feet high, which

which is garnished closely with rough spear-shaped leaves ending in acute points; they are four inches long, and one broad, very hairy on their under side, and sharply sawed on their edges, having three strong longitudinal veins; the flowers are disposed in a roundish panicle at the top of the stalk; the spikes of flowers are recurved; the flowers are small, and of a brimstone colour; this flowers in September, and frequently continues till the end of October.

The sixteenth sort grows naturally in North America; the stalks of this are very strong; they rise near two feet high, are very closely garnished with narrow, spear-shaped, stiff leaves, four inches long, and half an inch broad, a little indented on their edges, sitting close to the stalks. The flowers are disposed in large panicles at the top of the stalks; the spikes are long, recurved, and are composed of smaller spikes in clusters; the flowers are yellow, and appear in September. The seventeenth sort grows naturally in New England. The stalks rise two feet high; the lower leaves are oval, stiff, smooth, and entire; they are four inches long, and two inches and a half broad, standing upon foot-stalks which are four inches long; those on the upper part of the stalk are spear-shaped, entire, and embrace the stalk half round with their base. The flowers are disposed in loose spreading panicles at the top of the stalks; the spikes are short, clustered, and roundish; the flowers are of a bright yellow colour, and appear in August.

The eighteenth sort grows naturally at Mexico, but is hardy enough to thrive in the open air in England; the stalks of this are oblique; they rise a foot and a half high, are smooth, and have a brown bark, garnished with smooth, spear-shaped, entire leaves, three inches long and three quarters of an inch broad. The flowers come out upon branching foot-stalks on the side of the stalks, which are ranged on one side of the stalks, and have a few small leaves under the flowers. The flowers are yellow and appear the end of August.

The nineteenth sort grows naturally in North America. The stalks of this are very hairy, and rise four feet high, branching out toward the bottom; the lower part of the stalk is garnished with rough leaves three inches long and one broad; the branches grow erect, and are garnished with small leaves scarce one inch long, and an eighth broad, which are entire, and sit close to the stalk; the flowers are disposed in a close panicle at the top of the stalk, growing erect; they are yellow, and appear in September.

The twentieth sort grows naturally in North America. The lower leaves are thick, fleshy, and spear-shaped; they are ten inches long, and one inch and a half broad, and have three longitudinal veins; the middle surface of the leaves is smooth, but their edges are rough; they are of a deep green colour: the stalks rise four feet high, and are closely garnished with smooth entire leaves, of the same shape and texture as the lower, but greatly diminish in their size to the top of the stalk. The flowers are disposed in a compact panicle at the top of the stalk; the spikes grow erect, and the flowers are of a bright yellow colour; they appear in October, and in mild seasons continue great part of November.

The twenty-first sort grows naturally in Maryland; this hath a slender smooth stalk which rises a foot and a half high, garnished with narrow spear-shaped leaves two inches long, and half an inch broad, indented on their edges, and ending in acute points; the flowers are disposed in a loose panicle at the top of the stalk; the spikes of flowers are closer and thicker toward the top. The flowers are yellow, and appear in September.

The twenty-second sort grows naturally in North America; the lower leaves are fleshy, narrow, spear-shaped, and entire. The stalks are smooth, of a purplish colour, and rise near three feet high; they are garnished with long, narrow, smooth, keel-shaped leaves, which are entire. The flowers are disposed in a loose panicle at the top of the stalk; the spikes

are slender and erect. The flowers are of a bright yellow colour, and appear late in October, and sometimes continue till December.

The twenty-third sort grows naturally in New England. The lower leaves of this sort are long, narrow, and very smooth; they are keel-shaped and entire. The stalks are red, fleshy, and smooth; they rise two feet high, and are thinly garnished with narrow smooth leaves. The flowers are produced in loose panicles at the top of the stalks, and there are some single spikes of flowers which come out from the wings of the stalks below. The flowers are of a bright yellow colour, and appear in August.

The twenty-fourth sort grows naturally in North America; the stalks of this sort are smooth, erect, and rise a foot and a half high, garnished with narrow, smooth, entire leaves of a dark green colour. The flowers are disposed in close compact panicles at the top of the stalk; the spikes of flowers are short, and clustered together. The flowers are large, of a bright yellow, and appear in September.

The twenty-fifth sort grows naturally in New England; the stalks are round, hairy, and rise two feet and a half high; the upper branches come out in a loose panicle; the leaves stand close to the stalks; they are rough, spear-shaped, and entire; those on the lower part are two inches long, and half an inch broad, but are gradually smaller to the top. The spikes of flowers come out from the wings of the stalk; the lower are long, those above diminish to the top; the foot-stalks of the spikes have many small leaves growing along them, some of which are intermixed with the flowers. This sort flowers the middle of November.

The twenty-sixth sort grows naturally in North America; the lower leaves are oval, six inches long, and three broad, and end in acute points; they are sawed on their edges, and have several strong longitudinal veins; their foot-stalks are long, and have leafy borders or wings. The stalks grow a foot and a half high, branching out almost from the bottom; they are garnished with small, spear-shaped, entire leaves. The branches grow erect; they are closely furnished with small leaves below, and are terminated by short close spikes of white flowers, which appear the end of August.

The twenty-seventh sort grows naturally at Philadelphia; the lower leaves are spear-shaped, oblique, smooth, and entire, standing upon long foot-stalks. The stalks rise from three to four feet high; the spikes of flowers which come out from the wings of the stalks are long, blunt, and a little recurved at the end; those on the upper part of the stalk are erect, and clustered together in a close spike; they are yellow, and appear in September.

The twenty-eighth sort grows naturally at Philadelphia. The stalks of this sort are hairy, and branch out toward the top; they are garnished with rough spear-shaped leaves sitting close to the stalks. The lower leaves are four inches long, and an inch and a half broad; those on the stalks, gradually diminish in their size to the top; they are rough, veined, and sawed on their edges. The flowers are disposed in a paniced corymbus at the end of the branches; the spikes on the lower part are recurved, but those at the top are clustered and erect. This sort flowers in September and October.

The twenty-ninth sort grows naturally at Philadelphia; the lower leaves are smooth, entire, narrow, and spear-shaped; they are three inches and a half long, and half an inch broad, standing upon long foot-stalks. The stalks are round, smooth, and rise three feet high; they are garnished with very small smooth leaves which are entire, and sit close to the stalks. The flowers grow in a close panicle at the top of the stalk; they are of a bright yellow colour, and appear in September.

The thirtieth sort grows naturally at La Vera Cruz in New Spain, where it was discovered by the late Dr. Houstoun. The stalks of this are round, hairy,

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and rise near three feet high; they are garnished with oval spear-shaped leaves, placed opposite upon short foot-stalks; they are three inches long, and an inch and a quarter broad, their surface very rough, and their edges are crenated, of a dark green on their upper side, but pale on their under. The flowers are produced in short bunches from the wings of the leaves, at the upper part of the stalk; they are of a deep yellow colour, and pretty large.

The thirty-first sort grows naturally at La Vera Cruz, where it was discovered by the before-mentioned gentleman. This rises with a shrubby stalk seven or eight feet high, dividing into many spreading branches which are slender, ligneous, and covered with a smooth gray bark. The leaves are spear-shaped, smooth, and entire; they are two inches and a half long, and one broad, of a light green, and stand upon short foot-stalks. The flowers are produced at the end of the branches in a loose corymbus; they are large, of a pale yellow colour, and stand upon pretty long foot-stalks. The common empalement of the flowers is cut almost to the bottom. I believe Petiver has this plant in his Musæum, under the following title, *Pulmonaria Jamaicensis, salicis folio, calycibus paleaceis*. These plants are all of them hardy, (except the two sorts last mentioned) so will thrive in the open air in England. Many of them have specious panicles of flowers, so are great ornaments to the English gardens at the end of the summer, when there is a scarcity of other flowers, which renders them more valuable. The five first sorts are seldom admitted into gardens, as they do not make any great appearance, but the sorts from North America are better esteemed; these have been greatly increased in their number of late years, and if we can judge from the sorts which have been introduced from North America within a few years past, we must suppose that country abounds with many more sorts than are yet known.

These plants when they are once obtained, may be propagated in plenty by parting of their roots; the best time for doing it is in autumn, as soon as their flowers are past; but those sorts which do not flower till very late in the year, should be transplanted early in the spring before they begin to shoot, and the roots may be then parted; but if the spring should prove dry, they will require water to establish them well in the ground, otherwise they will not flower strong the succeeding autumn. Some of the sorts spread their roots, and propagate much faster than others, so these may be transplanted and parted every other year; or if the plants are wanted, they may be every year divided, but then they will not flower so strong as those which are suffered to remain longer unremoved; and those sorts whose roots do not multiply so fast, should be parted once in three years, if they are expected to flower strong.

The sorts which grow tall, are not very proper furniture for small gardens, because they require much room, for these should be allowed four or five feet, otherwise their roots will intermix with those of the neighbouring plants, and draw away their nourishment; therefore these plants are proper ornaments for large extended walks round fields, or for the borders of wood-walks, where they will make a fine appearance during their season of flowering; and as they require little culture, so they are adapted to those places. They will thrive in almost any soil, but when they are planted in good ground they will grow much larger, and make a better appearance.

These plants may also be propagated by seeds, but it is only the early flowering kinds which perfect their seeds in England. These seeds should be sown in autumn soon after they are ripe, for those which are kept out of the ground till spring seldom succeed, or at best do not come up the same year; they may be sown in drills upon a bed of fresh earth, at about a foot asunder, but the seeds should be scattered pretty thick in the drills, and covered lightly over with fine earth. When the plants come up, they must be kept clean from weeds, and where they are too

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close, part of them may be drawn out, and planted in a shady border, to allow room for the others to grow till autumn, when they should be transplanted where they are designed to remain. The following year they will flower, and their roots will abide many years.

The two last mentioned sorts are natives of a warm country, so they will not thrive here, unless they have artificial heat in winter, especially the last sort, which requires a warmer situation than the other. These plants should be planted in pots, and the last should be plunged into the tan-bed in the stove, and treated in the same way as other tender plants from the same country. This may be propagated by cuttings, which, if planted in pots filled with loamy earth, and plunged into a moderate hot-bed, will take root. The other sort is propagated by parting of the roots, in the same manner as the sort before mentioned; these should be kept in a moderate stove in winter, and in summer may be placed abroad in a sheltered situation.

SOLSTICE is the time when the sun is in one of the solstitial points; that is, when he is at his greatest distance from the equator, which is twenty-three degrees and a half; thus called, because he then appears to stand still, and not to change his place in the degrees of the zodiac any way; an appearance owing to the obliquity of our sphere, and which those who live under the equator are strangers to.

The Solstices are two in each year; the æstival, or summer Solstice; and the hyemal, or winter Solstice. The summer Solstice is, when the sun is in the tropic of Cancer, which is on the 21st of June, when he makes our longest day.

The winter Solstice is, when the sun enters the first degree of Capricorn, which is on the 21st of December; when he begins to turn toward us, and makes our shortest day.

This is to be understood, as in our northern hemisphere; for in the southern, the sun's entrance into Capricorn makes the summer Solstice, and that into Cancer the winter Solstice.

SONCHUS, Sowthistle.

These are many of them weeds in England, so are not planted in gardens; for if their seeds are once permitted to scatter upon the ground, they will soon stock it with plants; for which reason they should always be extirpated, not only those in the garden, but also those in the parts near it; because their seeds being furnished with down, are wafted in the air to a considerable distance, where, falling on the ground, they soon come up and prove troublesome weeds.

SOPHORA. Lin. Gen. Plant. 456.

The CHARACTERS are,

The flower hath a short bell-shaped empalement of one leaf, cut at the brim into five obtuse segments. The flower is of the butterfly kind; the standard is oblong, broad, and reflexed on the sides. It has two oblong wings with appendages to their base; the keel is of two leaves like those of the wings, whose lower borders join like the keel of a boat. It hath ten distinct stamina which are awl-shaped, parallel, and the length of the petals, hid in the keel, and terminated by small summits, and a taper oblong germen, supporting a style the length of the stamina, crowned by an obtuse stigma. The germen afterward turns to a long slender pod, with swellings where each seed is posited, which are roundish.

This genus of plants is ranged in the first section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and one style. This agrees in every character with the other butterfly flowers, except that the ten stamina in these flowers stand distinct, and those of the other butterfly flowers have their stamina joined in two bodies.

The SPECIES are,

1. **SOPHORA** (*Alopecuroides*) foliis pinnatis, foliolis numerosis villosis oblongis, caule herbaceo. Lin. Sp. Plant. 373. *Sophora with winged leaves, having a great number of oblong hairy lobes.* Ervum Orientale alopecuroides

curioides perenne, fructu longissimo. Tourn. Cor. 27. *Eastern, perennial, Foxtail Ervum, with a long fruit.*

2. SOPHORA (*Tomentosa*) foliis pinnatis, foliolis numerosis subrotundis. Lin. Sp. 373. *Sophora with winged leaves, composed of many roundish lobes. Coronilla Zeylanica, tota argentea. Burm. Zeyl. Jointed podded Colutea of Ceylon, all over silvery.*

3. SOPHORA (*Tinctoria*) foliis ternatis subsessilibus, foliolis subrotundis glabris. Lin. Sp. Plant. 373. *Sophora with trifoliate leaves sitting almost close to the stalks, whose lobes are roundish and smooth. Cytisus Americanus procumbens, flore luteo, ramosissimus, qui anil suppeditat. Trailing American Cytisus with a yellow flower and very branching, of which Indigo is made.*

The first sort grows naturally in the Levant; this hath a perennial creeping root, from which arise several erect stalks from three to four feet high, garnished with winged leaves, composed of a great number of oblong hairy lobes ranged by pairs along the midrib, terminated by an odd one. The flowers come out from the wings of the stalk in long spikes, which stand erect close to the stalk; they are of a pale blue colour, and small. These appear in July, but are rarely succeeded by pods in England.

It propagates fast enough by its creeping root, in the same manner as Liquorice, when the plant is once obtained, and is very hardy, so should be planted in some corner of the garden, at a distance from other plants, because the roots of this plant will spread, mix with those of the neighbouring plants, and soon overbear them. It will thrive in almost any soil or situation, for I have frequently seen the roots spread into the middle of gravel walks, and send up stalks.

The second sort grows naturally in the island of Ceylon, at Senegal in Africa, and also in the West-Indies, but particularly in Jamaica, where the inhabitants call it Sea-side Pigeon Pea: this rises with a downy stalk to the height of six or seven feet, garnished with winged leaves composed of five or six pair of roundish woolly lobes, terminated by an odd one. The flowers come out in short loose spikes from the wings of the stalks; they are large and yellow, not much unlike those of Spanish Broom, but have no scent; these are succeeded by taper woolly pods five or six inches long, having four or five large swellings, in each of which is contained one roundish brown seed as large as Peas.

This plant is tender, so will not thrive in England out of a stove; it is propagated by seeds which may be easily procured from the West-Indies, for the plants do not perfect them in England; these should be sown in pots, and plunged into a good hot-bed, where, if the seeds are good, the plants will appear in a month or six weeks. When these are fit to remove, they should be each transplanted into a separate pot filled with soft loamy earth, and plunged again into a hot-bed of tanners bark, observing to shade them from the sun till they have taken new root; after which they must be treated in the same way as other tender plants from the same countries, always keeping them in the bark-bed in the stove, and in the winter they should have but little water.

The third sort grows naturally in Virginia and Philadelphia, from both these places I have received the seeds; from this plant there was formerly a coarse sort of Indigo made in America, as there was from some other plants, before the true Indigo plants were introduced there: this hath a perennial root, from which arise several stalks about a foot and a half high, sending out from the bottom a great number of small branches, garnished with leaves composed of three oval smooth lobes joined together at the foot-stalk like other trifoliate leaves; they sit close to the branches. The flowers come out toward the end of the branches in short spikes; they are of the butterfly kind, yellow, and appear in July; they are often succeeded by short swelling pods, which in very warm seasons come to maturity in England. The stalks of this decay to the root in autumn.

This is propagated by seeds, which should be sown on a warm border in the beginning of April. The best way is to sow them in shallow drills for the more conveniently keeping the plants clean, for they must not be removed till their stalks decay in autumn, when they should be carefully taken up, and planted in a warm border where they are designed to remain, for they do not bear transplanting well.

SORBUS. Tourn. Inst. R. H. 633. Lin. Gen. Plant. 548. [so called of *forbere*, Lat. to sup, because the fruit, being ripe, is so soft, that it may be supped.] The Service-tree; in French, *Sorbier*.

The CHARACTERS are,

The flower has a spreading, concave, permanent empalement of one leaf, indented in five parts; it has five roundish concave petals which are inserted in the empalement, and about twenty awl-shaped stamina, which are also inserted in the empalement, terminated by roundish summits. The germen is situated under the flower, supporting three slender styles crowned by erect beaded stigmas; it afterward becomes a soft umbilicated fruit, inclosing three or four oblong cartilaginous seeds.

This genus of plants is ranged in the third section of Linnæus's twelfth class, which includes those plants whose flowers have from eleven to twenty stamina inserted in the empalement, and three styles.

The SPECIES are,

1. SORBUS (*Aucuparia*) foliis pinnatis, utrinque glabris. Hall. Helv. 250. *Service-tree with winged leaves which are smooth on both sides. Sorbus sylvestris, foliis domesticæ similis. C. B. P. 415. Wild Service with leaves like the cultivated, commonly called Quicken, Quickbeam, Mountain Ash, and in the north, Roan-tree.*
2. SORBUS (*Domestica*) foliis pinnatis, subtus tomentosis. Hall. Helv. 351. *Service-tree with winged leaves which are woolly on their under side. Sorbus fativa. C. B. P. 451. The cultivated Service.*

The first sort grows naturally in many parts of England, but in the southern counties they are seldom seen of any great magnitude, for the trees are commonly cut down, and reduced to underwood; but in the North of England and Wales, where they are permitted to grow, there are trees of very large size. The stems of this are covered with a smooth gray bark, the branches while young have a purplish brown bark, the leaves are winged; they are composed of eight or nine pair of long narrow lobes, terminated by an odd one; the lobes are about two inches long, and half an inch broad toward their base, ending in acute points, and are sharply sawed on their edges; the leaves on the young trees in the spring are hoary on their under side, which about Midsummer goes off, and those upon the older branches have very little at any season. The flowers are produced in large bunches almost in form of umbels, at the end of the branches; they are composed of five spreading concave petals shaped like those of the Pear-tree, but smaller; these appear in May, and are succeeded by roundish berries, growing in large bunches, which have a depressed navel on the top, and turn red in autumn when they ripen.

This tree is cultivated in the nursery-gardens, and sold as a flowering shrub; but, if they were permitted to grow, they would rise to a great height, and have large stems. The leaves of this tree make a pretty variety when they are mixed with others during the time of their flowering, and also in autumn. When their fruit is ripe they make a pretty appearance, but the blackbirds and thrushes are so fond of this fruit, as to devour it as soon as it ripens; so that in those places where there is a plenty of these birds, there will not be any of the fruit left to be perfectly ripe; however, as it is good for these songsters, where people have a desire of drawing a number of these birds about their habitations, they should plant a quantity of these trees for that purpose.

The second sort grows naturally in the warmer parts of Europe, where it rises to a great height, and becomes a large tree, but in England there are few of any large size. In the south of France and in Italy, the

the fruit is served up to the table in their deserts, but in England they have not been much esteemed, which has occasioned their being so little cultivated here. There are several varieties of this fruit, which differ from each other in size and shape, as Apples and Pears do; some of these are shaped like Catherine Pears, and are nearly as large; others are depressed at both ends, and shaped like Apples, but both these sorts will arise from seeds of the same tree, so that those who are desirous of having the largest and best kinds, should propagate them by grafting or budding from those trees whose fruit are the fairest and best flavoured, as is practised for other fruits; these may be grafted upon Pear-stocks, which agree better with this tree than any other except their own, for they will not take upon Apple-stocks, nor do they thrive upon the Hawthorn or Medlar near so well, though the fruit of this tree approaches nearer to those than any other, and are not fit for the table till they are in a state of decay.

The several varieties of this tree differ in the number of their seeds, in the same manner as Pears, Apples, Quinces, and Medlars, some of them having but three seeds in each fruit, and others have four or five; so that although one of the characters of this genus is, that the fruit has but three seeds, yet that must be understood to be of the wild sort, in which there are seldom more, but those of the cultivated kind are as uncertain as the fruit of Apples and Pears.

In Italy these trees are very common, where they have a great variety of sorts which have been obtained from seeds, but I have not observed in the English gardens more than three sorts, and those are yet very scarce, for there are at present but few large trees of the true Service in England, one of which was lately growing in the gardens formerly belonging to John Tradescant at South Lambeth, near Vauxhall in Surry, who was a very curious collector of rare plants in King Charles the Second's time, which tree was near forty feet high, and produced a great quantity of fruit annually which were shaped like Pears; and there are indeed some trees of middling growth in the gardens of Henry Marsh, Esq; at Hammersmith, which produce fruit of the Apple shape (from whence several young plants have been raised of late in the nurseries near London;) but these are small, compared to that in John Tradescant's garden.

There are great numbers of large trees of this Service growing wild about Aubigny in France, from whence his Grace the late Duke of Richmond brought a great quantity of the fruit, and from the seeds raised a great number of young plants in his garden at Goodwood in Suffex.

The leaves of this tree differ from those of the first, in their lobes being broader, and not so much sawed; they are also much more downy on their under side, and the young shoots of the tree in the spring are covered with a white down. The flowers are produced in larger and more diffused bunches, and are a little larger, but there are seldom more than two or three fruit produced upon each bunch. The stamina of the flowers are also longer than those of the wild sort, which are the only differences I can observe between them.

Both these sorts may be propagated by sowing their seeds in pots soon after the fruit is ripe, sheltering them under a common frame in winter, and plunging the pots into a moderate hot-bed in the spring, which will soon bring up the plants; and when they are come up, they should be carefully kept clear from weeds, and in dry weather watered; but they should be exposed to the open air, for the only reason of putting them in a hot-bed is to forward the growth of the seeds; but if, when the plants are come up, the bed is kept covered, it will draw the plants and spoil them. In this bed the plants should remain until the middle of October, at which time their leaves will

decay, when there should be a warm light spot of ground prepared to receive them, into which they should be planted in rows two feet asunder, and a foot distant in the rows, observing to take them up carefully, and to plant them as soon as possible, that their roots may not dry.

During the summer, the ground should be kept constantly clear from weeds, and in winter there should be a little mulch laid upon the surface of the ground about their roots, to protect them from being injured by frost; but in the spring the ground between them should be dug, burying the mulch therein, in doing of which you must be careful not to cut or injure the roots of the plants.

In this nursery they may continue three or four years according to their growth, when it will be proper to transplant them out where they are to remain; the best season for which is in October, or in the spring, just before they begin to shoot. The soil should be warm in which they are planted, and the situation defended from cold winds, in which place they will thrive, and produce fruit in a few years.

Those who raise many of these trees from seeds, will procure some varieties of the fruit, from which the best may be selected, and propagated for the table, and the others may be planted for variety in wildernesses or wood-walks, or may be used for stocks to graft the better kinds upon.

The wood of the wild Service-tree is much commended by the wheelwright for being all heart, and it is of great use for husbandmens tools, goads, &c. It is very white and smooth, so will polish pretty well.

There is a sort of this with variegated leaves, which is preserved by such as are curious in collecting the several sorts of striped plants, but there is no great beauty in it; it may be propagated by layers, or by being budded on the plain sort, but they become plain on a very rich soil.

The wild sort should have a moist strong soil, but will grow in the most exposed places, being extremely hardy, which renders them worthy of care, since they will thrive where few other trees will succeed.

SORREL. See ACETOSA.

SOUTHERNWOOD. See ABROTANUM.

SOWBREAD. See CYCLAMEN.

SPARTIUM. Lin. Gen. Plant. 765. Genista.

Tourn. Inst. R. H. 643. tab. 311. [so called of sparus, a dart, because the rushes of this plant represent a dart; or else of the Greek σπάρσιν, of σπέρσιν-σαι, to sow, because it sows itself.] Broom; in French, Genêt.

The CHARACTERS are,

The empalement of the flower is tubulous, heart-shaped, with a very short margin at the top, and has five small indentures, but below the flower the under side is extended. The flower is of the butterfly kind; the standard is almost heart-shaped, large, and wholly reflexed; the wings are oblong, oval, shorter than the standard, and annexed to the stamina; the keel is oblong, and longer than the wings, and the borders are hairy and connected together, to which the stamina are inserted. It has ten unequal stamina which are joined together, and are gradually longer, the upper being the shortest, and the under stands apart, terminated by oblong summits, and an oblong hairy germen, supporting a rising awl-shaped style, to which is fastened an oblong, hairy, inflexed stigma. The germen afterward becomes a long, cylindrical, obtuse pod of one cell, opening with two valves, including several globular kidney-shaped seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which includes those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. SPARTIUM (*Junceum*) ramis oppositis teretibus apice floriferis, foliis lanceolatis. Hort. Cliff. 956. *Broom with taper opposite branches whose tops have flowers, and spear-shaped leaves.* Genista juncea. J. B. 1. p. 395. *Rusby Broom, commonly called Spanish Broom.*

2. SPARTIUM

2. SPARTIUM (*Radiatum*) fessilibus petiolis persistentibus ramis oppositis angulans, foliis ternatis linearibus. Lin. Sp. Plant. 998. *Broom with trifoliate leaves sitting close to the stalk, angular opposite branches, and awl-shaped opposite leaves.* Genista radiata five stellaris. J. B. 1. 399. *Radiated starry Broom.*
3. SPARTIUM (*Monospermum*) ramis angulatis, racemis lateralibus, foliis lanceolatis. Lin. Sp. Plant. 995. *Broom with angular branches, short bunches of flowers on the sides of the stalk, and spear-shaped leaves.* Spartium tertium flore albo. C. B. P. 396. *A third Broom with a white flower, commonly called white Spanish Broom.*
4. SPARTIUM (*Scoparium*) foliis ternatis folitariisque, ramis inermibus angulosis. Hort. Cliff. 356. *Broom with trifoliate and single leaves, and angular unarmed branches.* Cytiso genista scoparia, vulgaris, flore luteo. Tourn. 649 *Common green Broom with a yellow flower.*
5. SPARTIUM (*Lusitanicum*) foliis ternatis, foliolis cuneiformibus, ramis inermibus angulatis. *Broom with trifoliate leaves, whose lobes are wedge-shaped, angular, and unarmed branches.* An? Cytiso-genista Lusitanica, magno flore. Tourn. Inst. 649. *Portugal Broom with a large flower.*
6. SPARTIUM (*Hirsutum*) foliis ternatis petiolatis, foliolis lineari-lanceolatis hirsutis, ramis inermibus angulatis. *Broom with trifoliate leaves upon foot-stalks, linear spear-shaped lobes which are hairy, and angular unarmed branches.*
7. SPARTIUM (*Glabrum*) foliis ternatis glabris fessilibus, ramis inermibus angulatis, leguminibus glabris. *Broom with trifoliate smooth leaves sitting close to the branches, which are angular and unarmed, and smooth pods.*
8. SPARTIUM (*Angulatum*) foliis folitariis ternatisque, ramis sexangularibus apice floriferis. Lin. Sp. Plant. 709. *Spartium with single and trifoliate leaves, and branches with six angles with flowers at their tops.* Spartium Orientale, siliqua compressa glabra & annulata. Tourn. Cor. 44. *Eastern Broom with round, smooth, compressed pods.*
9. SPARTIUM (*Spinosum*) foliis ternatis, ramis angulatis spinosis. Hort. Cliff. 356. *Broom with trifoliate leaves, and angular prickly branches.* Cytisus spinosus. H. L. *Prickly Cytisus.*
10. SPARTIUM (*Arborescens*) caule arborescente ramoso aculeato, foliis cuneiformibus confertis, floribus folitariis alaribus. *Broom with a tree-like, branching, prickly stalk, wedge-shaped leaves in clusters, and flowers standing singly on the side of the branches.* Spartium portulacæ foliis aculeatum, ebeni materie. Plum. Cat. 19. *Prickly Broom with Purslain leaves, or Ebony of the West-Indies.*

The first sort is the common Spanish Broom, which has been long cultivated in the English gardens for the sweetness of its flowers: of this there are two varieties, if not distinct species, which grow naturally in Spain and Portugal. The first, which is the common sort in England, has larger branches and broader leaves than the other. The flowers are also larger, of a deeper yellow colour, and appear earlier than those of the other, which has been of late years introduced from Portugal.

Both these sorts have smooth flexible branches, which rise eight or ten feet high. The lower branches are garnished with small, spear-shaped, smooth leaves, at the end of the shoots of the same year; the flowers are disposed in a loose spike; they are large, yellow, of the butterfly kind, have a strong agreeable odour, appear in July, and in cool seasons there is frequently a succession of flowers till September, which are succeeded by compressed pods about three inches long, containing one row of kidney-shaped seeds which ripen in autumn.

These plants are easily propagated by seeds, which should be sown in the spring upon a bed of common earth in a shady situation, where the plants will rise very freely; these must be kept clean from weeds the following summer, and in autumn they may be taken up and transplanted in a nursery, which should be

chosen in a warm sheltered situation. In the taking up of the plants, there should be care taken not to tear the roots, for these send their roots deep into the ground, and are very apt to be torn if they are not raised out of the ground with a spade; these should be planted in rows three feet asunder, and at one foot distance in the rows. In this nursery they may remain a year or two to get strength, and then may be planted where they are to remain, for they do not succeed if they are removed large.

If the seeds of these sorts are permitted to scatter in autumn, the plants will come up in plenty in the spring without care, and these may be transplanted the following autumn, and treated in the same way as those before mentioned. These shrubs are very ornamental to large wood-walks in gardens, but hares and rabbits are very fond of them; so that, unless they are screened from these animals, they will devour them in winter when they have a scarcity of other food.

The second sort grows naturally in Italy; this is a shrub of low growth, seldom rising two feet high, but divides into many spreading branches, so as to form a large bush. The branches are small, angular, and come out by pairs opposite; the leaves are very narrow, awl-shaped, and are placed round the stalk, spreading out like the points of a star; the flowers are disposed in small clusters at the end of the branches; they are yellow, but not more than half the size of those of the former, and have no scent; they are succeeded by short hairy pods, containing two or three small kidney-shaped seeds in each; it flowers in June, and the seeds ripen in August. This shrub makes a pretty appearance during the time of its continuing in flower, and as it is hardy, deserves a place in gardens.

It is propagated by seeds, which should be sown in autumn, for those which are sown in the spring seldom grow the same year; these may be sown in a bed of common earth in rows, for the more conveniently keeping the plants clean from weeds. The plants should remain in the seed-bed till the following autumn, when they may be either transplanted to the places where they are to remain, or in a nursery to grow a year or two to get strength, before they are planted out for good; but these plants will not bear transplanting when they are large, so should be removed while they are young.

The third sort hath a thick stalk, covered with a rugged bark when old; it rises eight or nine feet high, sending out many slender Rush-like branches of a silvery colour, almost taper, which terminate in very slender bending ends; these have a few narrow spear-shaped leaves on the lower branches. The flowers are produced in very short spikes or clusters on the side of the branches; they are small, white, and are succeeded by large oval pods containing one kidney-shaped seed. It flowers about the same time as the former.

This sort grows plentifully in Spain and Portugal, from both which countries the seeds may be easily procured. These seeds should be sown in the middle of April upon a bed of fresh light earth, but the best way will be to sow them in drills about half an inch deep. The drills should not be less than one foot asunder, and the seeds may be laid in the drills at about three inches distance, which will allow room for the plants to grow till Michaelmas following, before which time it will not be safe to remove them; nor should they be suffered to stand longer, because they shoot downright roots very deep into the ground, and if these are cut or broken, when they are grown large, the plants frequently miscarry. Although I have here directed the sowing of these seeds in April, yet it must be understood, if the season proves favourable, otherwise it will be better to defer it longer, for these seeds are as subject to perish in the ground by cold or wet, as are the Kidney-beans; therefore when the season is favourable for sowing them, the seeds of the Broom may be safely sown.

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At Michaelmas some of the plants may be taken up and potted, to be sheltered in winter, and others may be planted in a warm situation and on a dry foil, where, if the winter should not prove severe, they will stand very well. It will also be proper to leave some of the plants in the feed-bed, where, if the winter should prove severe, they may be sheltered with mats, and some mulch laid about their roots to prevent the frost penetrating the ground, for these plants are so tender as not to live abroad in hard frost, tho' in moderate winters they will do very well; but it is always necessary to have a plant or two of each sort in pots, that they may be sheltered in winter to preserve the sorts.

The fourth sort is the common Broom which grows naturally in England, so is not often admitted into gardens, though, when it is in flower, it makes a much better appearance than many others which are costly; this rises with a flexible stalk four or five feet high, sending out many Rush-like angular branches which spread out on every side. The lower part of the branches are garnished with trifoliate leaves, and upward they are single. The flowers come out upon short foot-stalks singly on the side of the branches, for a considerable length toward the top; these are large, of the butterfly kind, and of a bright yellow colour; they appear in May, and are succeeded by compressed hairy pods containing kidney-shaped seeds which ripen in August. The flowers and branches of this sort are used in medicine.

The fifth sort grows naturally in Portugal and Spain; this has stronger stalks than our common Broom. The branches grow more erect, and have deeper angles; the leaves are all trifoliate, and much larger than those of the fifth; the lobes are wedge-shaped; the flowers are larger, of a deeper yellow colour, and have longer foot-stalks. This flowers a little later in the year than that, and is not so hardy.

The sixth sort grows naturally in Portugal; this rises with a strong stalk like the former. The branches are angular and grow erect; they are better furnished with leaves than either of the other sorts, which stand upon pretty long foot-stalks; the lobes are small, very narrow, and hairy; the flowers grow closer together, are larger, and of a deep yellow colour.

The seventh sort was brought from Portugal. The stalks and branches of this are slender, angular, and smooth, and are fully garnished with very narrow, trifoliate, smooth leaves sitting close to the stalks. The flowers come out in long loose spikes at the end of the branches; they are large, of a bright yellow colour, and are succeeded by short compressed pods, which are smooth, containing small kidney-shaped seeds.

The eighth sort grows naturally in the Levant; this hath slender stalks and branches, which are garnished with a few trifoliate and single leaves toward the bottom. The branches have six angles or furrows; the flowers are small, of a pale yellow colour, and are produced in loose spikes at the end of the branches; these are rarely succeeded by seeds in England.

The ninth sort grows naturally in Italy and Spain near the sea-coast. The stalks rise five or six feet high, and send out many angular flexible branches, armed with long spines, upon which grow trifoliate leaves; the flowers are produced at the end of the branches in clusters, each standing upon a long foot-stalk; they are of a bright yellow colour, and appear in June; they are succeeded by short ligneous pods, with a thick border on their upper edges, containing three or four kidney-shaped seeds. This plant will not live abroad in England, unless it has a very warm situation.

These plants are raised from seeds in the same way as the first sort, and may be treated in the same manner.

The tenth sort is very common in Jamaica, and several other places in the West-Indies, where the wood is cut, and sent to England under the title of Ebony, though it is not the true Ebony, which is a native of the eastern country, and is a plant of a very different

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genus. The wood of this American Ebony is of a fine greenish brown colour, and polishes very well, so is much coveted by the instrument-makers; and is used for several purposes, being of a very hard durable nature.

This tree has a pretty thick stem which rises twelve or fourteen feet high, covered with a rugged brown bark, and divides into many spreading branches, which grow almost horizontal, and are armed with short brown crooked spines. The leaves are small, stiff, and wedge-shaped, coming out in clusters, and sit close to the branches. The flowers come out upon slender foot-stalks from the side of the branches singly; they are of the butterfly kind, of a bright yellow colour, and are succeeded by compressed moon-shaped pods, which inclose one kidney-shaped seed.

This plant is propagated by seeds, which must be procured from the countries of its natural growth, for the plants do not produce seeds in this climate. These seeds should be sown in pots filled with light fresh earth early in the spring, and plunged into a good hot-bed of tanners bark, or placed in tan under pots, as their covers are very hard. In about six weeks after the seeds are sown, the plants will appear, when they must be carefully treated (being very tender while young;) they must have fresh air admitted to them every day when the weather is warm, and should be frequently refreshed with water, when the earth in the pots appears dry. In about five or six weeks after the plants appear they will be fit to transplant, when they should be carefully shaken out of the pots and separated, planting each into a small pot filled with light rich earth, and then plunged into the hot-bed again, being careful to shade them from the sun every day until they have taken root; after which time they must be treated in the same manner as other very tender exotic plants, by giving them air every day in warm weather, and watering them once in two or three days gently, and when the nights are cold, to cover the glasses. In this hot-bed the plants may remain till autumn, when they must be removed into the stove, and plunged into the bark-bed. Those of them whose roots have filled the pots, should be carefully shifted into pots one size larger before they are plunged; but as these plants are not of quick growth while young, they do not require to be often shifted out of the pots. During the winter season these plants must be kept warm (especially the first year,) and must have but little water, and in cold weather it must be given to them in small quantities; and if their leaves should contract filth, they must be washed with a sponge to clean them, otherwise the plants will not thrive. As these plants are very tender when young, so they will not live in the open air in this country, even in the warmest part of the year; therefore they must be constantly kept in the stove, and should be kept plunged in the bark-bed, observing in the summer season, when the weather is warm, to admit a large share of fresh air to the plants; but when they have obtained strength, they may be exposed for three months in a warm situation in the summer.

SPERGULA. Dillen. Gen. Nov. 7. Lin. Gen. Plant. 519. Spurrey.

The CHARACTERS are,

The flower hath a spreading permanent empalement, composed of five oval concave leaves. It has five oval, concave, spreading petals which are larger than the empalement, and ten awl-shaped stamina shorter than the petals, terminated by roundish summits. It hath an oval germen, supporting five slender, erect, reflexed styles, crowned by thick stigmas. The germen afterward turns to an oval close capsule with one cell, opening with five valves, inclosing many depressed, globular, bordered seeds.

This genus of plants is ranged in the fourth section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and five styles.

The SPECIES are,

- I. SPERGULA (*Arvensis*) foliis verticillatis, floribus decandris. Hort. Cliff. 173. *Spurrey with leaves in whorls, and*

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and flowers with ten stamina. Aline *Spergula dicta* major. C. B. P. 251. Greater Chickweed, called *Spurrey*.

2. SPERGULA (*Pentandria*) foliis verticillatis, floribus pentandris. Lin. Sp. Plant. 440. *Spurrey with whorled leaves, and flowers with five stamina*. Aline *spergulae* facie minima, feminibus emarginatis. Tourn. Inst. 244. The least Chickweed with the appearance of *Spurrey*, having bordered seeds.

3 SPERGULA (*Nodosa*) foliis oppositis subulatis lævibus, caulibus simplicibus. Lin. Sp. Plant. 440. *Spurrey with awl-shaped smooth leaves placed opposite, and single stalks*. Aline *nodosa* Germanica. C. B. P. 251. Knotted German Chickweed.

There are some other species of this genus, which grow naturally as weeds in England, so are not worthy notice here; nor should I have mentioned these, were they not sometimes cultivated.

The first and second sorts are cultivated in Holland and Flanders, for feeding their cattle; the usual time of sowing the seed is in July or August, that the plants may acquire strength before the winter's cold. The use that is made of this, is to feed sheep, and other cattle in winter, when the common Grass is eaten bare. This plant seldom rises above six inches high, so will not afford a very great quantity of food; but as it will grow on the poorest sand, it may be cultivated in many places to good advantage, where no other Grass will thrive so well; and by feeding it off the ground, the dung of the cattle will improve the land. This pasture, it is affirmed, will make excellent butter; and the mutton fed on it, is said to be well tasted, so is by many preferred to that fed on Turneps. Hens will greedily eat this herb, and it makes them lay more eggs.

This plant being annual, must be sown every year; and whoever is willing to save the seeds, should sow it in April, that the plants may flower the beginning of July, and the seeds will ripen in August; when it must be cut before the heads are quite brown, otherwise the seeds will soon scatter.

The seeds being very small, about twelve pounds will be sufficient to sow an acre of land. The ground should be well harrowed before the seeds are sown, for if the larger clods are not broken, there will be an uneven crop of Grass. People in the low country, sow this seed after a crop of Corn is taken off the land. The second sort is now much cultivated in Flanders, though it is a much lower plant than the common sort, but they esteem it a much better Grass. The seeds of this kind are smaller and flatter than those of the common sort, and have a white border round each.

SPERMACOCE. Dill. Hort. Elth. 277. Lin. Gen. Plant. 111. Button Weed.

The CHARACTERS are,

The flower hath a small permanent empalement indented in four parts, sitting on the germen. It has one cylindrical petal, whose tube is longer than the empalement, and the brim indented in four parts, which spread open and are reflexed. It has four awl-shaped stamina shorter than the petal, terminated by single summits, and a roundish compressed germen situated under the flower, supporting a single style divided in two parts at the top, crowned by obtuse stigmas. The germen afterward turns to two oblong seeds which are joined, having two horns, and are convex on one side, and plain on the other.

This genus of plants is ranged in the first section of Linnæus's fourth class, which includes those plants whose flowers have four stamina and one style.

The SPECIES are,

1. SPERMACOCE (*Tenuior*) glabra foliis linearibus, staminibus inclusis. Lin. Sp. Plant. 102. Smooth *Spermacoe* with stamina included in the flower. *Spermacoe verticillis tenuioribus*. Hort. Elth. 370. *Spermacoe* with narrow whorls.

2. SPERMACOCE (*Verticillata*) glabra foliis lanceolatis verticillis globosis. Lin. Sp. Plant. 102. Smooth *Spermacoe* with spear-shaped leaves, and flowers in globular whorls round the stalks. *Spermacoe verticillis*

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globosis. Hort. Elth. 369. *Spermacoe* with globular whorls.

The first sort grows to the height of two feet and a half; the stalks are stiff, a little angular, and covered with a brown bark; the branches come out by pairs. There are two leaves at each joint placed opposite, which are two inches long, and almost a quarter of an inch broad, and between these come out three or four smaller, which stand in whorls round the stalks; they are smooth, and have one strong vein or midrib in the middle. The flowers grow in slender whorls toward the top of the stalks; they are small, white, and sit close to the stalks, having a whorl of leaves close under them; these are succeeded by two oblong seeds, having small horns which ripen in the empalement.

The second sort rises with a shrubby stalk three or four feet high, sending out a few slender branches, which are garnished with narrow leaves not so long as those of the former sort; they are smooth, of a light green, and stand in a kind of whorls round the stalk, two of them being larger than the others in each whorl. The flowers grow in thick globular whorls toward the top of the stalk, and one of the whorls terminates the stalk; they are small, very white, and funnel-shaped. The brim is cut into four obtuse segments which spread open, and the stamina stand out above the tube of the flower. After the flowers are past, the germen turn to two seeds, shaped like those of the former sort.

These plants grow naturally in moist places in Jamaica. The inhabitants call the second sort Button Weed. They are both propagated by seeds, which must be sown on a hot-bed, and when the plants come up they must be transplanted on a fresh hot-bed to bring them forward, and afterward treated in the same way as other tender plants; and if they are placed in a stove, they will live through the winter, and produce good seeds the following year.

SPHÆRANTHUS. Vaill. Act. Par. 1719. Lin. Gen. Plant. 893. Globe Flower.

The CHARACTERS are,

The flowers are composed of hermaphrodite florets, and female half florets, which are included in one globular scaly empalement, which is garnished with them on every side the receptacle. There are several of these florets included in each partial empalement. The hermaphrodite florets are placed in the center; they are funnel-shaped, and cut into five parts at the brim; they have five very short hair-like stamina, terminated by cylindrical summits, and a germen which decays, supporting a thick longer style, having a single stigma; these are barren. The female half florets are situated round the border, and have scarce any petals, but an oblong germen, supporting a bristly style crowned by a double stigma; these have one oblong naked seed.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which includes those plants whose flowers are composed of hermaphrodite barren florets, and female fruitful half florets.

The SPECIES are,

1. SPHÆRANTHUS (*Indicus*) pedunculis crispatis. Lin. Sp. Plant. 1314. Globe-flower with curled foot-stalks. *Sphæranthus purpurea alata ferrata*. Burm. Zeyl. 220. Purple, winged, sawed Globe-flower.

2. SPHÆRANTHUS (*Africanus*) pedunculis lævibus. Globe-flower with smooth foot-stalks. *Scabiosæ capitulo*, *chrysanthemi Myconi foliis*, *alato caule Maderaspatanus*. Pluk. Phyt. tab. 108. 7. A plant from Madras with a head like *Scabious*, leaves like the *Corn Marygold* of *Myconus*, and a winged stalk.

The first sort grows naturally in India; this rises with an herbaceous stalk about a foot high, which rarely branches out; it is garnished with spear-shaped leaves about three inches long, and one broad in the middle, whose base sits close to the stalk, and from them is extended a leafy border or wing along the stalk; they are sawed on their edges and are of a deep green, standing alternate. The foot-stalks of the flowers come out from the side of the stalk, opposite to the leaf;

leaf; they are about two inches long, and sustain one globular head of flowers at the top, of a purplish red colour; these are succeeded by oblong seeds situated on the margin, which are naked.

The second sort grows naturally at Madras, and also at La Vera Cruz in New Spain, where it was discovered by the late Dr. Houstoun; this rises with an herbaceous winged stalk about ten inches high, garnished with oval, spear-shaped, sawed leaves placed alternately. The upper part of the stalk branches out into small divisions, which are terminated by foot-stalks sustaining three or four globular flowers of a pale yellow colour.

These are both annual plants, which require a hot-bed to bring them forward in the spring, and if the summer proves cold, they must be kept in a glass-case, otherwise they will not ripen seeds here.

SPHONDYLUM. See HERACLEUM.

SPIGELIA. Lin. Gen. Plant. 192. Arapabaca. Plum. Nov. Gen. 10. tab. 31. Worm Grass.

The CHARACTERS are,

The empalement of the flower is permanent, of one leaf, which is cut into five acute points; it has one funnel-shaped petal, whose tube is longer than the empalement, cut into five points at the brim which spread open. It has five stamina terminated by single summits, and a germen composed of two globular lobes, supporting one awl-shaped style the length of the tube, crowned by a single stigma. The germen afterward becomes two globular seed-vessels which are joined, sitting in the empalement, filled with small seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one style.

The SPECIES are,

1. SPIGELIA (*Anthelmia*) caule erecto, foliis quaternis sessilibus; spicis terminalibus. *Worm-seed with an erect stalk, and leaves growing by fours sitting close to the stalks, which are terminated by spikes of flowers. Arapabaca quadrifolia, fructu testiculato. Plum. Nov. Gen. 11. Four-leaved Arapabaca with a testiculated fruit.*
2. SPIGELIA (*Lonicera*) foliis oppositis ovato-oblongis acuminatis sessilibus, spicis terminalibus. *Worm Grass with oblong acute-pointed leaves growing opposite, and sitting close to the stalks, which are terminated by spikes of flowers. Lonicera spinis terminalibus, foliis ovato-oblongis acuminatis distinctis sessilibus. Flor. Virg. 142. Lonicera with spikes of flowers terminating the stalks, and oval, oblong, acute-pointed leaves sitting close to the stalks.*

The first sort grows naturally in moist places in most of the islands in the West-Indies; this is an annual plant with a fibrous root, from which arise a strong, erect, herbaceous stalk a foot and a half high, which is channelled, sending out two side branches opposite near the bottom, and a little above the middle is garnished with four oblong, oval, acute-pointed leaves, placed in form of a cross round the stalk; these, and also the principal stalk, have four smaller leaves near the top, sitting round in the same manner as the other, and from these arise short spikes of herbaceous flowers, ranged one on one side the foot-stalk, which are succeeded by roundish twin capsules containing small seeds.

This plant is esteemed the most efficacious medicine for the worms yet known, and has been long used by the inhabitants of the Brasils as such; and also by the negroes, who taught the inhabitants of the British islands in America the use of it, where it has had great success, and from thence had the appellation of Worm Grass given to it.

It is too tender to thrive in the open air in England, so the seeds should be sown in pots filled with soft loamy earth in the autumn, and plunged into the bark-bed in the stove, where they should remain till the spring, when they should be plunged into a fresh hot-bed, which will bring up the plants; these must be afterward planted into separate pots, and plunged into another hot-bed, and shaded till they have taken

new root, after which they must be treated in the same way as other tender annual plants from the same countries, keeping them constantly in the hot-bed under cover, otherwise they will not perfect their seeds in England. This plant flowers in July, and the seeds ripen in September, which should be sown soon after, for if they are kept out of the ground till spring, they frequently fail.

This plant produces plenty of flowers, and the seeds seem to be well formed, but those which are sowed in England seldom grow: this may perhaps be occasioned by the plants being kept under cover, so that the farina does not properly impregnate the germen; whether it is from this cause, or what other I know not, but I have not been able to raise any plants from English seeds.

The second sort grows naturally in North America, where the inhabitants call it Indian Pink. This hath a perennial fibrous root, from which arise two or three erect herbaceous stalks about seven or eight inches high, garnished with three or four pair of oval, oblong, acute-pointed leaves, placed opposite, sitting pretty close to the stalk; they are smooth, entire, and have several veins which diverge from the midrib. The stalk is terminated by a short spike of flowers, which are ranged on one side the foot-stalk; they have short empalements which are cut into five acute segments. The tube of the flower is long, narrow at the bottom, swelling upward much larger, and is cut at the brim into five acute segments, which spread open flat; the outside of the flower is of a bright red, and the inside of a deep Orange colour. These appear in July, but the seeds never ripen here. This plant is used in North America, for the same purposes as the other is in the West-Indies, and is esteemed as the best medicine there yet known for the worms. A particular account of the virtues of this plant is mentioned in the first volume of the Philosophical Essays, printed at Edinburgh, communicated by Dr. Garden of Carolina.

This is not easily propagated in England, for the seeds do not ripen here, and the roots make but slow increase, so that the plant is very uncommon in the English gardens at present; for although it is so hardy as to endure the cold of our ordinary winters in the open air, yet, as it does not ripen seeds, the only way of propagating it is by parting of the roots; and as these do not make much increase by offsets, so the plants are scarce. It delights in a moist soil, and must not be often transplanted.

SPINA ALBA. See MESPILUS and CRATÆGUS.

SPINACIA. Lin. Gen. Plant. 986. Spinach, or Spinage; in French, *Epinars*.

The CHARACTERS are,

The flowers are male and female in different plants; the male flowers have an empalement cut into five oblong, obtuse, concave segments; they have no petals, but have five hair-like stamina longer than the empalement, terminated by oblong twin summits; these plants are barren. The female flowers have permanent empalements of one leaf, cut into four segments, two of which are very small; they have no petals, but a compressed roundish germen supporting four hair-like styles, crowned by single stigmas. The germen afterward turns to a roundish seed, which is shut up in the empalement, and in some species are almost smooth, but in others they have two or three sharp thorns.

This genus of plants is ranged in the fifth section of Linnæus's twenty-second class, which contains those plants which have male flowers on different plants from the fruit, and the male flowers have five stamina.

The SPECIES are,

1. SPINACIA (*Oleracea*) foliis sagittatis seminibus aculeatis. *Spinach with arrow-pointed leaves and prickly seeds. Spinacia vulgaris capsulâ seminis aculeatâ. Tourn. Inst. 533. Common Spinach with prickly capsules.*
2. SPINACIA (*Glabra*) foliis oblongo-ovatis, seminibus glabris. *Spinach with oblong oval leaves, and smooth seeds.*

seeds. Spinacia vulgaris, capsula feminis non echinata. Tourn. Inst. 533. Common Spinach with seed-vessels which are not prickly, but smooth.

The first sort was formerly more cultivated in the English gardens than at present, because it is much hardier, so not in much danger from cold, therefore was generally cultivated for use in winter. The leaves of this are triangular, and shaped like the point of an arrow; the stalks are hollow, branching, and herbaceous; they rise about two feet high. The male flowers are produced in long spikes; they are herbaceous having no petals, but each has five slender stamina, terminated by oblong twin summits filled with a yellowish farina, which, when ripe, flies out on the plants being shaken, and spreads all round; these plants after their farina is shed soon decay. The female flowers which are upon separate plants, sit in clusters close to the stalks at every joint; they are small, herbaceous, and have neither stamina or petals, but have roundish compressed germen, which afterward turn to roundish seeds, armed with short acute spines. The plant flowers in June, and the seeds ripen the beginning of August.

There are two or three varieties of this now cultivated in the kitchen-gardens, which differ in the size and shape of their leaves, and their seeds being more or less prickly.

The seeds of this kind should be sown upon an open spot of ground the beginning of August, observing, if possible, to do it when there is an appearance of rain; for if the season should prove dry for a long time after the seed is sown, the plants will not come up regularly; part of them may come up soon, and a great part of them may remain till rain falls before they come up, which if that should not happen in a little time after, many times there will not be half a crop. When the Spinach is come up, and the plants have four leaves, the ground should be hoed to destroy the weeds, and also to cut up the plants where they are too close, leaving the remaining plants about three or four inches asunder; but this should always be done in dry weather, that the weeds may be destroyed soon after they are cut.

About a month or five weeks after the first hoeing, the weeds will begin to grow again; therefore the ground should be then hoed again the second time, observing, as before, to do it in dry weather. But if the season should prove moist, it will be proper to gather the weeds up after they are cut, and carry them off the ground; for if the Spinach is not cleaned from weeds before winter, they will grow up and stifle it so much, that in wet weather the Spinach will rot away.

In October the Spinach will be fit for use, when you should only crop off the largest outer leaves, leaving those in the center of the plants to grow bigger; and thus you may continue cropping it all the winter and spring, until the young Spinach sowed in the spring is large enough for use, which is commonly in April; at which time the spring advancing, the Winter Spinach will run up to seed; so that it should be all cut up, leaving only a small parcel to produce seeds if wanted.

But if the ground in which this Winter Spinach is sown, being commonly planted with early Cabbages, it is not proper to let any of the Spinach remain there for seed; therefore it should be cleared off as soon as ever the Spring Spinach is fit for use, that the Cabbages may be earthed up and laid clear, which is of great service to them; wherefore you should sow a small spot of ground with this sort of Spinach, on purpose to stand for seed, where there should be no other plants among it.

The second sort differs from the first in having oval thick leaves, which are not angular at their base; the seeds are smooth having no spines, and the stalks and leaves are much more fleshy and succulent: of this there are two or three varieties, which differ in the thickness and size of their leaves, which in one are much rounder and thicker than the other.

These are sown in the spring upon an open spot of ground by themselves, or else mixed with Radish-seed, as is the common practice of the London gardeners, who always endeavour to have as many crops from their land in a season as possible; but where land is cheap in the country, it will be the better method to sow it alone without any other sort of seed mixed with it; and when the plants are come up, the ground should be hoed to destroy the weeds, and cut out the plants where they are too close, leaving the remaining about three inches asunder; and when they are grown so large as to meet, you may then cut out a part of it for use, thinning the plants that they may have room to spread; and this thinning may be twice performed, as there is occasion for the herb, at the last of which the roots should be left eight or ten inches asunder; and if then you hoe the ground over again to destroy the weeds, it will be of great service to the Spinach; for if the land is good upon which it is sown, the sort with broad thick leaves, commonly called Plantain Spinach, will with this management many times produce leaves as large as the broad-leaved Dock, and be extremely fine.

But in order to have a succession of Spinach through the season, it will be proper to sow the seed at three or four different times in the spring; the first in January, which must be on a dry soil; the second the beginning of February, upon a moister soil; the third the beginning of March, which should be on a moist soil; and the fourth the beginning of April; but these late sowings should be hoed out thinner at the first time than either of the former, for there will be no necessity to leave it for cutting out thin for use, because the former sowings will be sufficient to supply the table till these are full grown; besides, by leaving it thin at first, it will not be apt to run up to seed so soon as it would if the plants were close.

These sowings here mentioned are such as are practised by the kitchen-gardeners near London; but as this herb is much used in soups, &c. for great tables, there should be some seeds sown every three weeks, during the summer season, to supply the kitchen; but these late sowings should be on moist strong ground, otherwise, if the season proves hot and dry, the Spinach will run to seed before the plants obtain strength, especially if the plants do not stand thin.

In order to save seeds of either of these kinds, you should sow an open rich spot of ground, with the sort you intend in February, after the danger of being injured by frost is over; and when the plants are come up, they should be hoed out to six or eight inches distance, observing to cut down the weeds at the same time; and when the plants have grown about three weeks or a month longer, they should be hoed a second time, when they should be left twelve or fourteen inches asunder at least, for when they have shot out their side branches they will sufficiently spread over the ground.

You must also observe to keep them clear from weeds, which, if suffered to grow amongst the Spinach, will cause it to run up weak, and greatly injure it. When the plants have run up to flower, you will easily perceive two sorts amongst them, viz. male and female. The male will produce spikes of staminate flowers, which contain the farina, and are absolutely necessary to impregnate the embryos of the female plants, in order to render the seeds prolific. These male plants are, by the gardeners, commonly called She Spinach, and are often by the ignorant pulled up as soon as they can be distinguished from the female, in order, as they pretend, to give room for the seed-bearing to spread; but, from several experiments which I have made on these plants, I find wherever the male plants are entirely removed before the farina is shed over the female plants, the seed will not grow which they produce, so that it is absolutely necessary to leave a few of them in every part of the spot, though there may be a great many drawn out where they are too thick, for a small quantity of male plants (if rightly situated) will be sufficient to impreg-

nate a great number of female, which, when ripe, will spread to a considerable distance, when the plants are shaken by the wind.

When the seeds are ripe (which may be known by their changing their colour, and beginning to shatter) the plants should be drawn up, and spread abroad for a few days to dry, observing to turn them every other day, that the seeds on both sides may dry equally; you must also guard the seeds from birds, otherwise they will devour them. When it is dry, the seeds should be threshed out, cleaned from the dirt, and laid up for use where mice cannot come to them, for they are extremely fond of this feed.

SPIRÆA. Tourn. Inst. R. H. 618. tab. 389. Lin. Gen. Plant. 554. [so called of Σπειρα, a rope, because this shrub is flexible like a rope.] *Spiræa Frutex*, vulgò.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, plain at the base, and cut into five acute segments at the top; it has five roundish oblong petals inserted in the empalement, and twenty or more slender stamina which are shorter than the petals, and are inserted in the empalement, terminated by roundish summits, and five or more germen supporting as many slender styles, which are longer than the stamina, crowned by beaded stigmas. The germen afterward turns to an oblong, acute-pointed, compressed capsule, opening with two valves, containing a few small acute-pointed seeds.

This genus of plants is ranged in the fourth section of Linnæus's twelfth class, which contains those plants whose flowers have about twenty stamina inserted in the empalement, and five styles.

The SPECIES are,

1. **SPIRÆA** (*Salicifolia*) foliis lanceolatis obtusis ferratis nudis, floribus duplicato-racemosis. Hort. Cliff. 191. *Spiræa* with spear-shaped, obtuse, naked, sawed leaves, and flowers in double branching spikes. *Spiræa salicis folio*. Tourn. Inst. 618. *Spiræa Frutex*, vulgò.
2. **SPIRÆA** (*Opulifolia*) foliis lobatis ferratis, corymbis terminalibus. Lin. Sp. Plant. 489. *Spiræa* with lobated sawed leaves, and flowers growing in a corymbus terminating the stalks. *Spiræa opuli folio*. Tourn. Inst. 618. *Spiræa* with a Marsh Elder leaf, commonly called *Virginia Gelder Rose*, with a Currant leaf.
3. **SPIRÆA** (*Hypericifolia*) foliis obovatis integerrimis, umbellis sessilibus. Hort. Upsal. 131. *Spiræa* with oval entire leaves, and umbels of flowers sitting close to the branches. *Spiræa hyperici folio non crenato*. Tourn. Inst. 618. *Hypericum Frutex*, vulgò.
4. **SPIRÆA** (*Crenata*) foliis oblongiusculis apice ferratis, corymbis lateralibus. Lin. Sp. Plant. 489. *Spiræa* with oblong leaves whose points are sawed, and flowers growing in a corymbus on the sides of the branches. *Spiræa Hispanica*, *hyperici folio crenato*. Tourn. Inst. 618. *Spanish Spiræa* with a notched leaf.
5. **SPIRÆA** (*Tomentosa*) foliis lanceolatis inæqualiter ferratis subtus tomentosis, floribus duplicato-racemosis. Lin. Sp. Plant. 480. *Spiræa* with spear-shaped leaves which are unequally sawed, woolly on their under side, and flowers growing in double branching bunches. *Ulmaria pentacarpos*, *integris ferratis foliis parvis subtus incanis Virginiana*. Pluk. Alm. 393. *Meadow-sweet of Virginia*, with small, entire, sawed leaves, which are hoary on their under side, and a fruit having five cells.
6. **SPIRÆA** (*Sorbifolia*) foliis pinnatis, foliolis uniformibus ferratis, caule fruticoso, floribus paniculatis. Lin. Sp. Plant. 490. *Spiræa* with winged leaves whose lobes are uniformly sawed, a shrubby stalk, and flowers growing in panicles. *Spiræa sorbi folio*, *tenuiter crenato*, *floribus in thyrsis albidis*. Amman. Ruth. 186. *Spiræa* with a Service-tree leaf which is slightly crenated, and white flowers growing in a thyrsis.
7. **SPIRÆA** (*Trifoliata*) foliis ternatis ferratis subæqualibus, floribus subpaniculatis. Lin. Sp. Plant. 490. *Spiræa* with trifoliate sawed leaves which are almost equal, and flowers growing in a kind of panicle. *Ulmaria major trifolia*, *flore amplo pentapetalo*, *Virginiana*. Pluk. Alm. 393. *Greater three-leaved Virginia Meadow-sweet*, with a large flower having five petals.

8. **SPIRÆA** (*Filipendula*) foliis pinnatis, foliolis uniformibus ferratis, caule herbaceo, floribus cymosis. Lin. Sp. Plant. 490. *Spiræa* with winged leaves having uniform sawed lobes, an herbaceous stalk, and flowers growing on slender foot-stalks at the top. *Filipendula vulgaris*, an *molon Plinii*. C. B. P. 163. *The common Dropwort*.
9. **SPIRÆA** (*Angustifolia*) foliis pinnatis, foliolis difformibus pinnato-ferratis, floribus cymosis. *Spiræa* with winged leaves whose lobes are difformed and sawed like wings, and flowers growing at the top of the stalks on slender foot-stalks. *Filipendula omni parte major*, *folio angustiori*. Boerh. Ind. alt. 1. p. 43. *Dropwort greater in every part, and having a narrower leaf*.
10. **SPIRÆA** (*Ulmaria*) foliis pinnatis, impari majore lobato, floribus cymosis. Flor. Lapp. 201. *Spiræa* with winged leaves, whose outer lobe is greater and divided into lobes, and flowers growing in bunches on weak foot-stalks. *Ulmaria*. Clus. Hist. 198. *Meadow-sweet, or Queen of the Meadows*.
11. **SPIRÆA** (*Aruncus*) foliis supra decompositis, spicis paniculatis, floribus divisis. Lin. Sp. Plant. 490. *Spiræa* with more than compounded leaves, paniculated spikes, and male and female flowers. *Barba capræ floribus oblongis*. C. B. P. 163. *Goats Beard with oblong flowers*.

The first sort has been long cultivated in the English gardens, but from what country it originally came, is not very certain; it is generally sold by the nursery-gardeners with other flowering shrubs, for planting wilderness work; it rises with several shrubby stalks, which are very taper and rough toward the top, and are covered with a reddish bark. The leaves are spear-shaped, about three inches long, and one broad in the middle; they are bluntly sawed on their edges, and of a bright green colour. In rich moist ground the stalks will rise five or six feet high, but in moderate land from three to four, for their whole height is one year's growth from the root. These are terminated by spikes of pale red flowers; the lower part of the spikes are branched out into smaller, but the upper parts are close and obtuse. Each flower is composed of five petals which spread open; they are of a pale red or flesh colour, and have a great number of stamina, some of which stand out much beyond the petals, but others are not so long; they are terminated by brown headed summits, and in the center are situated five styles, which are terminated by headed stigmas. After the flowers are past, the germen turn to pointed capsules, but they rarely come to perfection here. This shrub flowers in June and July, and in moist seasons there is frequently young shoots from the root, which flower in autumn.

This plant may be propagated from suckers which are sent forth in plenty from the stems of the old plants, or by laying down the tender branches, which when rooted, should be transplanted out in rows at three feet distance, and the plants a foot asunder in the rows. In this nursery they may remain two years, observing to keep the ground clear from weeds, and in the spring to dig up the ground between the rows, so that the roots may the more easily extend themselves; but if they put out suckers from their roots, those should be taken off to keep the shrubs within bounds, and afterwards they may be transplanted where they are to remain, either in small wilderness quarters, or in clumps of flowering shrubs, observing to place them amongst other sorts of equal growth. The young shoots of this shrub being very tough and pliable, are often used for the tops of fishing-rods.

The second sort grows naturally in North America, but it is now as common in the English gardens as the first; this rises with many shrubby branching stalks, sometimes eight or ten feet high in good ground, but generally five or six; they are covered with a loose brown bark which falls off, and are garnished with lobed leaves about the size and shape of those of the common Currant Bush, ending in acute points, and are sawed on their edges. The flowers are produced

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in roundish bunches at the end of the branches; they are white, with some spots of a pale red. It flowers in June. This is commonly known in the nurseries by the title of Virginia Gelder Rose, with a Currant leaf; it may be propagated and managed in the same manner as the former, and is equally hardy.

The third came originally from Canada, but is now as common in the nursery-gardens as either of the former, where it is known by the title of *Hypericum Frutex*, but has no affinity to *St. Johnswort*, and is only so called from the resemblance of their leaves; this rises with several slender shrubby stalks five or six feet high, covered with a dark brown bark, sending out small side branches the whole length, garnished with small wedge-shaped entire leaves, which have many punctures on their surface like *St. Johnswort*. The flowers are disposed in small umbels which sit close to the stalks, each flower standing upon a long slender foot-stalk; they are white, composed of five roundish petals which spread open, and in the center have a great number of stamina almost equal in length with the petals. This sort flowers in May and June, and as the flowers are produced almost the length of the branches, the shrubs make a good appearance during the time of their flowering.

This may be propagated by laying down the under branches, which will take root in the compass of one year, when they may be taken off, and planted in a nursery for two or three years (as hath been directed for the former;) after which they may be transplanted out where they are designed to remain, placing them with the two former, being nearly of the same growth, where they will add to the variety.

The fourth sort grows naturally in Spain; this is not very common at present in the English gardens. The whole appearance of this shrub is so like the third, as not to be distinguished at a small distance; the only difference being, that the leaves of this are broader at the point, where they have two or three indentures. The flowers are like those of the former, and appear at the same time. This may be propagated in the same way as the former.

The fifth sort grows naturally in Philadelphia; this is a shrub of lower stature than the former. The stalks are slender, and branch out near the ground; they have a purple bark covered with a gray mealy down. The leaves are spear-shaped, but smaller than those of the first sort, and are unequally sawed; they are downy and veined on their under side, but are of a bright green above. The branches are terminated by a thick racemus of flowers, which are branched toward the bottom into small spikes; the flowers are very small, of a beautiful red colour, and appear in July; the spikes of this are longer than those of the first.

The sixth sort grows naturally in North America; this rises with shrubby stalks like the first, but sends out horizontal branches which are slender, and covered with a brown bark. The leaves are spear-shaped, of a thin texture, and a bright green colour on both sides; they are slightly sawed on their edges, but the saws are acute. The flowers are disposed in panicles at the end of the branches; they are small, white, and of the same construction of the former, having many stamina which are a little longer than the petals, terminated by large, roundish, brown summits. This sort flowers the beginning of August.

These sorts are propagated in the same way as the first, but, as some of them do not put out suckers from their roots here in any plenty, their branches should be laid down in autumn, which in one year will take root, and may then be planted where they are designed to remain, or into a nursery, where they may stand one or two years to get strength before they are planted out for good.

The seventh sort grows naturally in North America; this hath a perennial root, but the stalks are annual, and rise about a foot high, sending out branches from the side their whole length; these are garnished with leaves, which for the most part are trifoliate, but are

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sometimes single, and at others by pairs; they are about an inch and a half long, and half an inch broad, ending in acute points; they are sharply sawed on their edges, of a bright green on their upper side, and pale on their under. The flowers are disposed in loose panicles at the top of the stalks, standing upon slender foot-stalks; they have five long spear-shaped petals which spread open, and a great many stamina which are no longer than the tube of the flower. This sort flowers in July, and the seeds ripen in September.

It is propagated by seeds, which should be sown on a shady border soon after they are ripe, for if they are sown in the spring, the plants will not come up till the year after, and many times fail. When the plants appear, they must be constantly kept clean from weeds, but they should not be removed till autumn, when their leaves begin to decay; then they may be either transplanted where they are designed to remain, or into a nursery-bed, where they may grow a year or two to get strength before they are planted out for good. This plant loves a shady situation and a moist light soil.

The eighth sort is the common Dropwort, which grows plentifully upon chalky grounds in many parts of England. The roots of this consist of a great number of oval knobs or glandules, which are fastened together by slender fibres, from whence it had the title of Dropwort; the leaves spread near the surface of the ground, are winged, seven or eight inches long, and composed of many sawed lobes, which are almost placed alternately along the midrib; those near the base are the smallest, the others increase in size to the middle, afterward decrease again to the point, and sit close to the midrib. The flower-stalk rises a foot or more in height, and has seldom more than one leaf upon it; the top is garnished with loose bunches of small white flowers, standing upon slender foot-stalks which are constructed like those of the other sorts, but are succeeded by several capsules, which are ranged circularly: it flowers in June. The roots of these plants are used in medicine, and are accounted diuretic. It is rarely kept in gardens, but there is a variety of this with double flowers, which was found growing naturally in the north of England, that is kept in gardens for the sake of variety.

The ninth sort was given me many years since by the late Dr. Boerhaave of Leyden, but from whence he received it I do not know. The leaves of this are much longer and narrower than those of the common sort; the lobes of the leaves are unequal in length, some being two inches and a half long, and others not more than one inch; they are sawed on their edges; the segments are opposite, and ranged like the lobes of winged leaves. The flower-stalk rises much higher, and sustains a much larger bunch of flowers. This flowers at the same time with the other.

The tenth sort grows naturally on the sides of waters, and in low moist meadows in most parts of England. The stalks are angular, red, and rise three or four feet high, garnished with winged leaves, composed of two or three pair of large indented lobes, terminated by an odd one, which is much larger than the other, and divided into three parts or lobes; they are of a dark green on their upper side, but hoary on their under. The stalks are terminated by large loose bunches of white flowers, which have an agreeable scent; these appear in June, and are succeeded by roundish capsules, twisted like a screw, filled with small seeds.

The leaves and tops of this plant are used in medicine, but the plants are rarely kept in gardens. There is a variety of this with double flowers which is kept in some gardens, and one with variegated leaves.

The eleventh sort grows naturally upon the mountains in Austria; this hath a perennial root, and an annual stalk which rises from three to four feet high, garnished with decomposed winged leaves, which are composed of several doubly-winged leaves, each having

having three or four pair of oblong lobes terminated by an odd one; these are two inches long, and almost one broad, sawed on their edges, and ending in acute points. The flowers are disposed in long slender spikes, which are formed into loose panicles at the top of the stalks; they are small, white, and of two sexes in the same spike; they appear in July, but the seeds rarely ripen here.

This plant is kept in gardens for the sake of variety; it may be propagated by parting of the root in autumn; it loves a moist soil and a shady situation.

The shrubby sorts require no other pruning, but to cut out all the dead branches and such as grow irregular, and take off all their suckers every year, for if these are permitted to grow, they will starve the old plants by drawing away their nourishment. The ground between them should also be dug every spring to encourage their roots, and every third year a little rotten dung buried therein, which will cause them to flower very strong.

SPIRÆA OF AFRICA. See DIOSMA.

SPONDIAS. Lin. Gen. Plant. 577. Plum. Nov. Gen. 22. Black American Plum.

The CHARACTERS are,

It hath a small coloured empalement of one leaf, cut into five segments which fall off; and five oblong, plain, spreading petals to the flower, and ten awl-shaped erect stamina alternately longer, terminated by oblong summits, with an oval germen supporting five short styles, crowned by obtuse stigmas. The empalement afterward becomes a Plum, having five large punctures, inclosing an oval, ligneous, fibrous nut.

This genus of plants is ranged in the fourth section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and five styles.

The SPECIES are,

1. SPONDIAS (*Purpurea*) petiolis communibus compressis. Lin. Sp. Plant. 613. *Spondias whose common foot-stalks are compressed. Myrobalanus minor, folio fraxini alato, fructu purpureo officulo magno fibroso.* Sloan. Cat. Jam. 182. *Myrobalon with an Ash leaf, and purple fruit with a large fibrous stone.*
2. SPONDIAS (*Lutea*) foliolis nitidis. Lin. Sp. Plant. 613. *Spondias with neat leaves. Monbin arbor folio fraxini, flore luteo racemoso.* Plum. Gen. *Tree Monbin with an Ash leaf and yellow fruit.*

The first sort grows naturally in many places in the West Indies; its usual height is about ten or twelve feet, and their stems as large as a man's leg, sending out branches toward the top, which have a gray bark; these are destitute of leaves for some months, but in the spring before the leaves appear, there are many small purple flowers which come out from the side of the branches; these are succeeded by a fruit like Plums, having a luscious thin pulp, covering a large fibrous stone. The leaves which come out afterward are unequally winged, having four or five pair of lobes about an inch long, and half an inch broad, terminated by an odd one.

The second sort grows also in the warmest parts of America, where it rises to the height of thirty feet or more, sending out many crooked irregular branches, which are also destitute of leaves for some months; the branches have a light coloured bark, and are garnished with unequal winged leaves, which have four or six pair of lobes near two inches long, and one broad, having deep longitudinal veins. The flowers come out before the leaves appear, which are succeeded by yellow Plums an inch or more in length, growing in a sort of racemus. These have large fibrous stones with a thin covering of flesh.

These plants grow easily from cuttings when they are once obtained, which if planted in pots filled with light rich earth, and plunged into a moderate hot-bed, covering them down either with bell or hand-glasses to exclude the external air, and shaded from the sun, will take root freely. The best time for this is in the spring, before the plants put out their leaves. They may also be propagated by their stones, if they are brought over fresh, which should be put into small

pots filled with the same rich earth, and plunged into a hot-bed of tanners bark, observing duly to water the earth, and in about six or seven weeks the plants will appear. These should afterward be treated in the same way as the Annona, keeping them constantly in the tan-bed in the stove, and when they are destitute of leaves, give them but little water.

SQUASHES. See PEPO.

SQUILLS. See SCILLA.

STACHYS. Tourn. Inst. R. H. 186. tab. 86. Lin. Gen. Plant. 638. [of *στάχυς*, an ear of Corn, because the flowers of this plant resemble an ear of Corn.] Base Horehound.

The CHARACTERS are,

The flower hath a tubulous, angular, permanent empalement, cut into five acute parts at the top; it has one lip-shaped petal, with a short tube having oblong chaps. The upper lip is erect, hooked, and a little indented at the point; it is large, reflexed, and cut into three parts, the middle segment being large and indented at the point. It has four awl-shaped stamina, two of which are longer, and inclined to the upper lip; the other two are shorter, terminated by single summits, and a four-pointed germen, supporting a slender style the length of the stamina, crowned by a bifid acute stigma. The germen afterward turns to four oval angular seeds which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which includes those plants whose flowers have two short and two longer stamina, and the seeds are naked in the empalement.

The SPECIES are,

1. STACHYS (*Germanica*) verticillis multifloris, foliorum ferraturus imbricatis, caule lanato. Lin. Sp. Plant. 812. *Base Horehound with a woolly stalk, woolly leaves which are sawed, and whorls of flowers. Stachys major Germanica.* C. B. P. 236. *Greater German Base Horehound.*
2. STACHYS (*Cretica*) verticillis multifloris, calycibus pungentibus caule hirtio. Hort. Upsal. 170. *Base Horehound with many flowers in the whorls, and prickly empalements. Stachys Cretica.* C. B. P. 236. *Base Horehound of Candia.*
3. STACHYS (*Italica*) foliis lineari-lanceolatis tomentosis subcrenatis, petiolis longissimis, caule fruticoso tomentoso. *Base Horehound with narrow, spear-shaped, woolly leaves which are somewhat crenated, grow on very long foot-stalks, and have a shrubby woolly stalk. Stachys minor Italica.* C. B. P. 236. *Lesser Italian Base Horehound.*
4. STACHYS (*Alba*) foliis oblongo-ovatis crenatis pilosis calycibus pungentibus, labii superiore piloso. *Base Horehound with oblong, oval, crenated, hairy leaves, prickly empalements to the flowers, and the upper lip hairy. Stachys alba, latifolia major.* Barrel. Icon. 297. *Greater, broad-leaved, white Base Horehound.*
5. STACHYS (*Alpina*) verticillis multifloris, foliorum ferratum apice cartilagineis, corollis labio plano. Flor. Suec. 527. *Base Horehound with sawed leaves, having cartilaginous tops, and many flowers in whorls. Stachys hormini folio obscure virenti, flore ferrugineo.* Mor. Hort. Reg. Blæs. 198. *Base Horehound with an obscure green Clary leaf, and an iron-coloured flower.*
6. STACHYS (*Hispanica*) foliis inferioribus ovato-oblongis subcrenatis subtus tomentosis, caulibus cordatis acutis sessilibus, calycibus spinosis. *Base Horehound with oval, oblong, lower leaves, which are slightly crenated, woolly on their under side, those on the stalks being heart-shaped, acute-pointed, and sitting close to the stalks, and prickly empalements to the flowers. Stachys elatior, flore flavescente punctato.* Act. Phil. Lond. N° 383. *Taller Base Horehound with a yellowish spotted flower.*
7. STACHYS (*Glutinosa*) ramis ramosissimis, foliis lanceolatis glabris. Hort. Cliff. 310. *Base Horehound with very spreading branches, and smooth spear-shaped leaves. Galeopsis angustifolia Cretica viscosa. Narrow-leaved viscous Hedge Nettle of Crete.*

8. STACHYS (*Palustre*) verticillis sexfloris, foliis linearilanceolatis semiamplexicaulibus. Flor. Suec. 490. *Base Horebound with whorls of six flowers, and narrow spear-shaped leaves which half embrace the stalk. Stachys palustris foetida. C. B. P. 236. Stinking marsh Base Horebound, or Gerard's Cloud's Woundwort.*

9. STACHYS (*Spinosa*) ramulis spina terminalis. Hort. Cliff. 310. *Base Horebound with spines terminating the branches. Stachys spinosa Cretica. C. B. P. 236. Prickly Base Horebound of Crete.*

10. STACHYS (*Orientalis*) foliis tomentosis ovato-lanceolatis, floralibus verticillo brevioribus. Prod. Leyd. 318. *Eastern Base Horebound, with oval, spear-shaped, woolly leaves, and flowers shorter than the whorls. Stachys Orientalis altissima foetidissima. Tourn. Cor. 12. The tallest Eastern Base Horebound, which is very fetid. There are some other species of this genus which grow naturally in England, and others are common in different parts of Europe; but as they are rarely admitted into gardens, it would be beside my purpose to enumerate them here.*

The first and the eighth sorts here mentioned, grow naturally in England; the first only in a few particular places, but the latter is common by the side of ditches and waters every where, and is here only mentioned, because it is a dispensary plant, and has been supposed a good vulnerary herb. Of this there is another species, which was found by Mr. Stone-street growing wild, with narrow leaves, shorter stalks, longer closer spikes of flowers, and the leaves stand distinct upon short foot-stalks, and this has constantly retained its difference in the garden. Both these sorts have creeping roots, so will soon spread over a large spot of ground where they have liberty.

The seventh sort grows naturally in Crete; this is a low plant, with an herbaceous stalk which is very branchy from the bottom. The stalks are slender, four-cornered, and smooth; they are garnished with a few small spear-shaped leaves: the whole plant is very clammy, and smells like bitumen. The flowers are small, of a dirty white colour, and stand in small whorls round the stalks. These appear in July, and are succeeded by roundish seeds which ripen in autumn.

This is propagated by seeds, and requires to be sheltered under a frame in winter, being too tender to live in the open air here.

The other sorts are kept in botanic gardens for the sake of variety, but are not cultivated in other places, so it will be needless to give a particular description of them here.

They are propagated by seeds, which should be sown in March upon a bed of light fresh earth, and when the plants are come up, they may be planted out into other beds about six inches asunder, observing to water them until they have taken root, after which they will require no farther care but to keep them clear from weeds till Michaelmas, when they should be transplanted where they are to remain, which must be in an open situation, and upon a dry light soil, not rich, in which they will endure the winter much better than in good ground. The summer following these plants will flower, and in August their seeds will ripen, when they may be gathered and preserved till spring for sowing; many of them die soon after.

STÆHELINA. Lin. Gen. Plant. 844.

The CHARACTERS are,

The common empalement of the flower is oblong, cylindrical, and imbricated; the scales are coloured and reflexed; the flower is composed of several uniform florets, which are the length of the empalement; they are funnel-shaped, and of one petal. The brim is cut into five equal acute segments, is bell-shaped, and have each five hair-like stamina terminated by cylindrical summits, with a short germen supporting a slender style, crowned by a double oblong stigma. The germen afterward becomes a short four-cornered seed, crowned with a feathery down, which ripens in the empalement.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which includes those

plants whose flowers are composed of only hermaphrodite florets which are fruitful, and have their summits connected together in a tube.

The SPECIES are,

1. STÆHELINA (*Gnaphalodes*) foliis tomentosis, squamis calycinis lanceolatis, apice membranaceis reflexis. Lin. Sp. Plant. 840. *Stæhelina with woolly leaves, and spear-shaped scales to the empalements, with reflexed membranaceous tops. Jacea Æthiopica, stachados citrinæ majoribus tomentosis foliis, capitulorum spinis & squamulis ex aureo colore nitentibus. Pluk. Alm. 193. tab. 302. Æthiopian Knapweed with woolly leaves like the greater Goldlocks, and the spines and scales of the brad of a shining gold colour.*

2. STÆHELINA (*Dubia*) foliis linearibus denticulatis, squamis calycinis lanceolatis, pappo calycibus duplo longioribus. Lin. Sp. Plant. 1176. *Stæhelina with leaves which are linear and indented, scales to the empalement which are spear-shaped, and down longer than the empalement. Santolina foliis linearibus, flore solitario terminali, squamis calycinis crenatis. Hort. Cliff. 398. Stæhelina with linear indented leaves, and spear-shaped scales to the empalement. Elichrysum sylvestre, flore oblongo. C. B. P. 265. Wild Immortal Flower, with an oblong flower.*

The first sort grows naturally at the Cape of Good Hope, from whence it was introduced into the Dutch gardens; this rises with a shrubby stalk about three feet high, and divides into several branches, which are garnished with long, taper, woolly leaves set thinly upon the branches. The flowers are produced at the end of the branches in single heads, which are pretty large, and have scaly empalements; these terminate in spines which are recurved; they are composed of several florets which are tubulous, hermaphrodite, and of a yellow colour, each of which is succeeded by a single four-cornered seed crowned with a feathery down, and ripens in the empalement, each being separated by a chaffy scale.

The second sort is a native of Spain and Italy; this is a low shrub, seldom rising more than two feet high, sending out many slender branches which are garnished with leaves placed alternate; there is a small knob or angle, just under that part where the leaf is inserted to the branch; the leaves are narrow, and have three blunt angles or corners. The branches are terminated by a single flower, whose empalement is oval, and like those of the flowers of Knapweed, being imbricated. The scales are oblong, oval, and their points are rounded; some of them have a large membranaceous border whose edge is crenated, and spread open; the florets are yellow and equal, of the same length as the empalement; they are all hermaphrodite and have a bifid stigma, and the seeds have a little hairy down on their top.

As these plants do not always ripen their seeds in England, so they are generally propagated by cuttings, which if planted in any of the summer months, and covered close with a bell or hand-glass, will take root pretty freely. When these have made good roots, they should be taken up carefully and planted in pots filled with fresh light earth, not too rich, and placed in the shade until they have taken new root; then they should be removed to a sheltered situation, where they may be intermixed with other exotic plants till the autumn, when they must be removed into shelter, and treated in the same way as other plants from the same country. These plants do not require any artificial heat in winter, but should have a dry air, for their tender shoots are very subject to rot with damp; therefore they will thrive better in a glass-case, than a green-house in winter.

STAMINA, CHIVES, or FILAMENTS, are the small threads which encompass the style in the center of flowers; upon the tops of which the apices or summits, which contain the male dust, hang, so are generally termed the male organs of generation.

STAMINEOUS FLOWERS are such as have a number of stamina, or chives; but are destitute of

five coloured leaves, which are called petala, the stamina being only encompassed by the flower-cup; of this sort are the male plants of Nettles, Spinach, Hemp, &c.

STAPELIA. Lin. Gen. Plant. 271. Asclepias. Tourn. Inst. R. H. 94. Swallow-wort, or Fritillaria crassa.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, cut into five acute segments; it has one large plain petal, cut into five acute segments above the middle, and a plain five-pointed starry nectarium with linear segments, whose torn points surround the parts of generation; it has five plain, broad, erect stamina, with linear summits fastened on each side the stamina, and two oval plain germen having no style, crowned by a blunt stigma. The germen afterward turn to two oblong taper pods filled with compressed seeds, crowned with a feathery down, lying over each other like the scales of fish.

This genus of plants is ranged in the second section of Linnæus's fifth class, which includes those plants whose flowers have five stamina, and two styles or germen.

The SPECIES are,

1. STAPELIA (*Variegata*) denticulis ramorum patentibus. Vir. Cliff. 20. *Stapelia with spreading indentures to the branches.* Asclepias Africana aizoides. Tourn. Inst. 94. *African Swallow-wort like Houseleek, commonly called Fritillaria crassa.*
2. STAPELIA (*Hirsuta*) denticulis ramorum erectis. Hort. Cliff. 77. *Stapelia with erect indentures to the branches.* Asclepias Africana aizoides, flore pulchrè fimbriato. Com. Rar. Plant. 19. *African Swallow-wort like Houseleek, with a fine fringed flower.*

There are some other species of this genus, which grow naturally at the Cape of Good Hope; the figures and descriptions of some sorts, having been exhibited by the learned Dr. Burman, professor of botany at Amsterdam, though we have not more than three species in England, one of which has not yet flowered here. There is a variety of the first sort mentioned in books, with flat crested branches, and is by some gardeners titled Coxcomb Fritillary; but this is no other than three, four, or more branches, joined together and becoming flat, so will return back to its original again, therefore is not worthy notice.

The first sort rises with many succulent branches, about the size of a man's finger, which are four or five inches long, having several protuberant indentures on their sides, which spread open horizontally, ending in acute points; these branches spread on the ground and emit roots from their joints, so where they have room will extend very wide; they are angular, and of a deep green colour in summer, when they are free in growth, but in winter they change to a purplish colour; they abound with a viscous juice of a nauseous taste. From the side of the branches toward their bottom comes out the foot-stalk of the flower at one of the sinuses, which is short, and sustains one flower, having a large thick petal which is cut half way into five points like a star, which spreads open flat; these are greenish on the outside, but yellow within, having a circle of purple round the nectarii, and the whole petal is finely spotted with purple, resembling the belly of a frog. In the center are the five compressed nectarii which are prominent, of a livid colour, which include the genital parts. The flower, when blown, has a very foetid odour like that of carrion, so like as that the common flesh fly deposit their eggs on it, which frequently are hatched, but wanting proper food die soon after; for I have many years watched the progress of these, to see if the maggots produced from these eggs ever eat any part of the flower, or lived any time, but could never observe either; nor have ever heard that any other person of credit has, though it has been asserted, that they have devoured great part of the petal, and come to maturity, changing afterward into their last state of flies. After the flowers are past, the double germen changes into

four taper pods joined at their base, which are near a span long, and almost as thick as a man's finger, which are filled with flat seeds crowned with a feathery down, lying over each other like the scales of fish, but these pods are seldom formed in England; for in upward of forty years which I have cultivated these plants, I never saw them produce their pods but three times, and those plants were plunged into the tan-bed in the stove, into which the branches had put out long roots, and thereby became very luxuriant.

The branches of the second sort are much larger than those of the first, and stand more erect, but spread and emit roots in the same way; they have four longitudinal furrows, which divide them into four angles, which have protuberant indentures on their edges, whose points are erect; they are nearly of the same colour as those of the first, being of a dark green in summer, but inclining to purple in autumn. The flowers come out upon short foot-stalks from the side of the branches; these are of the form with those of the former, but are much larger; the petal is of a thicker substance, and on the inside covered with fine purplish soft hairs; the ground of the flower is an herbaceous yellow, streaked and chequered with purplish lines. This sort produces its flowers in much greater plenty than the first sort, so that in summer and autumn these plants are seldom long destitute of flowers, but I have never seen any of the pods of this sort produced in England.

Both these plants grow naturally upon the rocks near the Cape of Good Hope, where they strike their roots into the crevices of the rocks and spread themselves greatly. They are propagated here very easily, by taking off any of the side branches during any of the summer months, which, when planted, put out roots very freely. The branches should be slipped off from the plants to the bottom, where they are joined by a small ligature, so will not occasion a great wound, the joints at the place where they are connected being almost closed round; for if they are cut through the branch, the wound will be so great as to occasion their rotting when planted: these should be laid in a dry place under cover for eight or ten days, that the wounded part may dry and heal over before they are planted, otherwise they will rot; then they should be planted in pots filled with earth, composed of fresh sandy earth, mixed with lime rubbish and sea sand; and if the pots are plunged into a very moderate hot-bed, it will promote their taking root; they should be now and then sprinkled with water, but it must be given them sparingly; and as soon as they have taken root, they must be inured to the open air. If these plants are kept in a very moderate stove in winter, and in summer placed in an airy glass-case, where they may enjoy much free air, but be screened from wet and cold, they will thrive and flower very well; for although they will live in the open air in summer, and may be kept through the winter in a good green-house, yet those plants will not flower so well as those managed in the other way. These plants must have little water given them, especially in winter.

STAPHYLÆA. Lin. Gen. Plant. 336. Staphylo-dendron. Tourn. Inst. R. H. 616. tab. 386. so called of *σταφυλή*, a Grape, and *δένδρον*, a tree, because its fruit grows upon trees in clusters.] Bladder-nut; in French, *Nex-Coupez*.

The CHARACTERS are,

The empalement is roundish, concave, and coloured, so large as to inclose the flower, which has five oblong erect petals like the empalement, and a pitcher-shaped concave nectarium at the bottom of the flower, with five oblong erect styles terminated by single summits, and a thick germen divided in three parts supporting three styles, to which there are obtuse stigmas contiguous. The germen afterward become two hard almost globular seeds, included in three-cornered bladders, joined by a longitudinal seam, with an acute point opening within.

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This genus of plants is ranged in the third section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and three styles.

The SPECIES are,

1. STAPHYLÆA (*Pinnata*) foliis pinnatis. Hort. Cliff.
112. *Bladder-nut with winged leaves.* Staphylo-
dron sylvestre & vulgare. H. L. *The common wild*
Bladder-nut.
2. STAPHYLÆA (*Trifoliata*) foliis ternatis. Hort. Cliff.
112. *Bladder-nut with trifoliate leaves.* Staphylo-
dron Virginianum trifoliatum. H. L. *Three-leaved*
Virginian Bladder-nut.

The first sort grows naturally in woods in several parts of England, but is cultivated as a flowering shrub in the nursery-gardens. This hath several shrubby stalks arising from the same root, which grow ten or twelve feet high, covered with a smooth bark, and divide into several branches which are soft and pithy; they are garnished with winged leaves, composed of two pair of oval lobes terminated by an odd one; these differ greatly in size according to the strength and vigour of the shrubs; some are more than two inches long, and an inch and a half broad, but on old weak shrubs they are much smaller. They are smooth, entire, and of a light green colour, standing upon pretty long foot-stalks. The flowers come out upon long slender foot-stalks which hang downward; these spring from the wings of the stalks near their extremity. The flowers are disposed in oblong bunches; they have each five oblong white petals, which expand in form of a Rose; these appear in May, and are succeeded by inflated capsules or bladders composed of three cells, one or two of which have a roundish, smooth, hard seed, and the other are barren.

This shrub makes a variety when intermixed with others which flower at the same season, though their flowers are not very beautiful. The nuts of this tree being hard and smooth, are strung for beads by the Roman catholics in some countries; and the children of the poor inhabitants eat the nuts, though they have a disagreeable taste.

The second sort grows naturally in North America, from whence it was brought into Europe, where it is now become as common in the nursery-gardens about London, as the other sort. This hath a more substantial stalk than the first; the bark of the old branches and stalks is smooth and of a gray colour, that of the young is of a light green and very smooth; the leaves are by threes on each foot-stalk; the lobes are oval ending in a point, and their edges are sawed; they are of different sizes, according to the age and strength of the plants. The largest are three inches long and two broad, but in old plants the leaves are not much more than half the size; they are smooth, and of a light green colour. The flowers are produced from the side of the branches in longer bunches than those of the former sort, but their foot-stalks are much shorter; the flowers are of a cleaner white, and their petals are somewhat larger than those of the first, as are also the bladder capsules; the seeds are larger, and ripen better than those of the common sort. The time of flowering and the ripening of the seeds, is the same with that.

Both these sorts are usually propagated by suckers from the root, which the first sort sends out in plenty; these should be taken from the old plants in autumn, and their roots trimmed, then planted in a nursery, in rows at three feet distance, and one foot asunder in the rows; in this nursery the plants should stand one or two years according to their strength, and then be transplanted to the places where they are to remain.

The plants which are propagated in this manner from suckers, are very subject to put out suckers in greater plenty from their roots, than those which are raised from seeds, or propagated by layers or cuttings, so are not to be chosen when the other can be had; therefore those who propagate them for their own use, should prefer the other methods. If they are propagated by layers, the young branches should be laid

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down in autumn, in the same manner as is practised for other trees and shrubs; these will have put out roots the following autumn, when they may be taken from the old plants and planted in a nursery, where they may grow one or two years to get strength, and then may be removed to the places where they are to stand.

When these are propagated by cuttings, it should be the shoots of the former year, and if they have a small piece of the two years wood at the bottom, they will more certainly succeed; for as the young shoots are soft and pithy, so they are very subject to rot, when they have no part of the old wood to them. They should be planted in autumn on a shady border, but must not have too much wet.

They may also be propagated by sowing their seeds early in autumn, in beds of light fresh earth, and when the plants are come up, they must be carefully kept clear from weeds, and in very dry weather, if they are now and then refreshed with water, it will greatly promote their growth; in these beds they may remain until October following, at which time they should be carefully taken up and planted in a nursery, placing them in rows three feet asunder, and the plants one foot distance in the rows; and, if the following spring should prove very dry, it will be convenient to give them a little water to encourage their taking root; after which they will require no farther care but to keep the ground clean from weeds in summer, and every spring to prune off irregular branches, and dig the ground between the rows to loosen the earth, that their roots may the more easily extend. In this nursery they may remain two years, by which time it will be proper to transplant them out where they are to remain, either in wilderness quarters, or in clumps of various trees, where they will add to the diversity. The best season for transplanting these trees is in autumn, with other deciduous trees. When these seeds are sown in the spring, the plants seldom come up till the following year.

AFRICAN BLADDER-NUT. See ROYENA.

LAUREL-LEAVED AMERICAN BLADDER-NUT. See PTELEA.

STAR-FLOWER. See ORNITHOGALUM.

STARWORT. See ASTER.

STATICE. Tourn. Inst. R. H. 341. tab. 177. Lin. Gen. Plant. 348. Thrift, or Sea Pink.

The CHARACTERS are,

The flowers are collected in a roundish head, having a common scaly empalement; each flower has a funnel-shaped empalement of one leaf. The flowers have five petals, they are funnel-shaped, the base of the petals are narrow, their points broad, obtuse, and spread open; they have five stamina which are shorter than the petals, terminated by prostrate summits; and a small germen supporting five styles which stand apart, crowned by acute stigmas. The germen afterward turns to one small roundish seed inclosed in the empalement.

This genus of plants is ranged in the fifth section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and five styles. To this genus he has joined the Limonium of Tournefort.

The SPECIES are,

1. STATICE (*Armeria*) scapo simplici capitulo, foliis linearibus. Lin. Sp. Plant. 394. *Thrift with single stalks, linear leaves, and flowers in heads.* Caryophyllus montanus major, flore globoso. C. B. P. 211. *Greater Mountain Pink with a globular flower.*
2. STATICE (*Montana*) foliis linearibus subulatis, squamis calycinis obtusis. *Thrift with linear awl-shaped leaves, and obtuse scales to the empalement.* Statice montana minor. Tourn. Inst. R. H. 341. *Smaller Mountain Thrift.*
3. STATICE (*Maritima*) foliis linearibus planis, squamis calycinis obtusis. *Thrift with plain linear leaves, and obtuse scales to the empalement.* Caryophyllus marinus minimus, flore globoso. H. P. Blæs. *The least Sea Pink with a globular flower.*

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The first fort grows naturally on the Alps, and other cold mountains in several parts of Europe. This has a perennial fibrous root, from which come out many narrow spear-shaped leaves about four inches long, and half an inch broad in the widest part; they are smooth, of a dark green colour, and sit close over each other at their base. The foot-stalks of the flowers rise about a foot high; they are naked, and terminated by one globular head, containing several small, pale, red flowers, which are included in one common scaly empalement; the lower scales are acute-pointed, and immediately under the flower is placed five narrow leaves which afterward fall off. This plant flowers in June, and the flowers are succeeded by oblong seeds which are closely wrapped up in the particular empalement of the flower, and ripen in August. There is a variety of this with white flowers.

The second fort is also a native of the Alps, and other cold mountains, where it seldom rises more than two inches high, but when it is planted in gardens, it becomes much larger. The roots of this are fibrous and perennial; they divide into heads, which have a great number of narrow Grass-like leaves, which have three corners at their base, sitting close round the heads, whose base embrace the stems and lie over each other. The stalks are naked, and rise about six inches high, sustaining on their tops heads of pale purplish flowers, inclosed in one common scaly empalement, whose scales are broad and rounded at their points. The flowers appear the latter end of May, and if the season is not very hot, they will continue good part of June.

There is a variety of this with bright red flowers, which is commonly called Scarlet Thrift; the flowers of this make a much better appearance than those of the other, so has been much more cultivated in gardens; but neither of the kinds are greatly esteemed at present, and therefore seldom seen in any modern gardens.

The third fort grows naturally in salt marshes, where the sea flows over them frequently, in many parts of England, so is very rarely admitted into gardens. The leaves of this fort are very narrow, short, and plain; the stalks seldom rise more than three or four inches high; the heads of flowers are small, and the flowers are of a pale flesh colour, so make but little appearance; it flowers later in the season than either of the former.

There was some years past another species of this genus in the English gardens, which came from Portugal. This had a thick perennial stalk which by age became shrubby, and rose to be a foot and a half in height; the leaves were like those of the first fort, but much larger; the foot-stalks of the flowers were a foot and a half long, naked, and terminated by one large globular head of flowers, of a pale red colour; but all the plants of this kind which were in England, the severe frost in the beginning of the year 1740 destroyed, since which time I have not seen one of them.

The second fort has been planted in gardens, to make edging on the sides of borders in the flower-gardens; for which purpose they were formerly in great esteem, but of late they have been very justly rejected for that use; because there was a necessity of transplanting these edgings every year, otherwise they could not be kept within due bounds; besides, wherever a plant failed, which was no extraordinary thing, there always appeared a large unsightly gap; however, tho' they are not in use at present for that purpose, yet a few plants of the first and second should have a place in some part of the flower-garden, for variety; especially the variety with red flowers will grow in almost any soil or situation, and their flowers will continue a long time in beauty.

All these forts may be propagated by parting their roots; the best time for which is in autumn, that they may take root before the frost, which will cause them to flower much stronger than those transplanted

in the spring; and the plants will not be in so much danger of miscarrying as those are, especially when the spring happens to prove dry. After these plants have taken root, they will require no farther care but to keep them clean from weeds, and to transplant and part their roots annually, for if they are permitted to stand longer unremoved, they are very subject to rot and decay, especially when they are planted in good ground.

STATUES and VASES contribute very much to the embellishment and magnificence of a garden, and extremely advance the natural beauties of it. They are made of several forms, and different materials. The richest are those of cast brass, lead gilt, and marble; the ordinary sort are of a common stone or stucco.

Among figures are distinguished groups, which consist at least of two figures together in the same block; figures insulate or detached, that is, those that you can go quite round, and figures that are set in niches, which are finished on the fore part only.

There are likewise busts, termes, half-length figures, figures half as big as the life, and those bigger than the life, that are called colossal, either on regular pedestals, or such as are more slender, tapering, and hollowed, not to mention the figures which sometimes adorn cascades, as also bas-relievos, &c.

These figures represent all the several deities, and illustrious persons of antiquity, which should be placed properly in gardens.

The river gods, as Naiads, Rivers, and Tritons, should be placed in the middle of fountains and basons.

The gods of the woods, as Sylvans, Fauns, and Dryades, in the groves; sacrifices, bacchanals, and children sports, are likewise represented in bas-relievo upon the vases and pedestals, which may be adorned with festoons, foliage, mouldings, and other ornaments.

In woods and groves, Sylvanus, god, and Feronia, goddess, of the woods; Acteon the hunter, who chancing to espy Diana bathing, she transformed him into a hart, and he was devoured by his own dogs. Also,

Echo, a virgin rejected of her lover, who pined away in the woods for grief, where her voice still remains, answering the outcries of every complaint. Also, Philomela, transformed into a nightingale, and Irys, into a pheasant.

Jupiter, Mars, and Bellona, should possess the largest open centers and lawns of a grand design, elevated upon pedestals, columnal, and other architectural works, with their immediate servants and vassals underneath; Jupiter with his Mercury, Mars with Fame, and the rest of their attendants.

Also Minerva or Pallas, goddess of wisdom: with the several liberal sciences; the three destinies, Clotho, Lachesis, and Atropos; Tellus, the goddess of earth; Priapus, the god of gardens; Pytho, the goddess of eloquence; Vesta, the goddess of chastity.

Neptune, in his chariot, should possess the center of the greatest body of water, whether it be fountain, bason, or whatsoever there is of that kind, and attended with the Naiades, Tritons, and his other sea attendants.

For canals, basons, and fish-ponds, Palæmon, Paniscus, and Oceanus, gods; Dione, Melicerta, Thetis, and Marica; sea goddesses; Salacia, goddess of the water; Naiades, fairies of the water; and the sirens, Parthenope, Ligia, and Leucosia.

Flora and Chloris, goddesses of flowers, and also Venus, Daphne, and Rucina, the goddesses of weeding, in the flower-garden.

The Dii minores ought also to possess the niches. Ceres, Pomona, and the Hesperides, Ægle, Arethusa, and Hesperethusa, who were three sisters, feigned to have an orchard of golden Apples, kept by a dragon, which Hercules slew when he took them away, should be placed in the orchard. the fauns and sylvans should be placed in the more remote and rural centers and parts of the wood work.

Bacchus

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Bacchus, the god of wine, and Silenus, in vineyards. Daphne and Diana, Flora and Venus, should have their places in the flower-garden.

Æolus, god of the winds, and the Oreades, fairies of the mountains, should be placed on high mounts, terrace walks, &c.

The goddesses Vallenta in vallies.

Harpocrates and Angerona, the former the god, and the latter the goddess, of silence, and Mercury, the god of eloquence, in private cabinets in a wilderness or grove.

Aristæus, the patron of bees, near an apiary.

Morpheus and Pan, gods of sheep, Pales, the goddess of shepherds, and Bubona, the goddess of oxen, in small paddocks of sheep in open lawns. But unless these statues are good, or copies from those which are so, there had better be none in gardens, for persons of good taste cannot bear to see ordinary ones.

STELLATE plants are such as have their leaves placed at certain knots or intervals of the stalks in form of a star: of this tribe are Madder, Goose-grafs, Ladies Bedstraw, &c.

STERILITY signifies barrenness.

STEWARTIA. Lin. Gen. Plant. 758.

The **CHARACTERS** are,

The flower has a permanent empalement of one leaf, cut into five oval concave segments; it has five large oval petals which spread open, and a great number of slender stamina which are joined in a cylinder at bottom, which are shorter than the petals, to which they are connected at their base, and are terminated by roundish prostrate summits, with a roundish hairy germen, supporting five styles the length of the stamina, crowned by obtuse stigmas. The germen afterward turns to a five-cornered capsule with five cells, opening with five valves whose cells are closed, each containing one oval compressed seed.

This genus of plants is ranged in the third section of Linnæus's sixteenth class, which includes those plants whose flowers have many stamina connected together in a column.

We know but one **SPECIES** of this genus, viz.

STEWARTIA (*Malacodendron*.) Aët. Upsal. 1741. Lin. Sp. Plant. 698. *Stewartia*. Malacodendron. Mitch.

The title of this genus was given it in honour of the Right Honourable the Earl of Bute, whose great knowledge of the science of botany is well known to all who have have the honour of his lordship's acquaintance.

This shrub grows naturally in Virginia, where it rises with strong ligneous stalks to the height of ten or twelve feet, sending out branches on every side, covered with a brown bark, garnished with oval spear-shaped leaves like those of the Cherry-tree, about two inches and a half long, and one inch and a half broad; they are sawed on their edges, and are pretty much veined, standing alternately. The flowers are produced from the wings of the stalk; their empalements are of one leaf, cut into five obtuse segments almost to the bottom. The flower is of one petal (according to Ray and Tournefort,) which is cut into five parts almost to the bottom, but their base are connected together, and fall off united; the segments are narrow at their base, but spread open, are broad and obtuse at their points, and hollowed like a spoon in the middle; they are white, but one of the segments in each flower is stained with an herbaceous yellow colour. In the center of the flower arise five styles, which are surrounded by a circle of purple stamina, terminated by roundish blue summits. The stamina are inserted to the base of the petals, so form at their base one body, being there connected together. It flowers the latter end of May. The fruit of this is a conical, dry, ligneous capsule, having five sharp angles and five cells, which open at the top with five valves, each cell containing one oblong smooth seed.

This shrub is at present very rare in the English gardens. The seeds are seldom brought to England, and those frequently fail, either by their not having been properly impregnated, or duly ripened, for I

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have examined several which have been hollow, having only a shell; and when the plants come up, they are very difficult to maintain while young; for if they are exposed to too much sun, they will soon be destroyed, nor do they thrive when exposed to the open air. The only way in which I have seen the young plants succeed was, when they were sown under glasses, and the surface of the ground between the plants covered with Moss to keep the ground moist, and the glasses were constantly shaded every day when the sun was bright. With this management the plants seemed in good health, but made little progress in their growth.

STOCK GILIFLOWER. See **CHEIRANTHUS**.

STOEBE. Lin. Gen. Plant. 839.

The **CHARACTERS** are,

The flower is composed of many hermaphrodite florets, which are included in one common empalement, whose scales are awl-shaped and permanent; between each scale is situated one floret, whose empalement is composed of five narrow acute leaves which are equal and erect. The florets are funnel-shaped, of one petal, cut into five points at the brim, spread open; they have five short hair-like stamina, terminated by cylindrical summits with five indentures, and an oblong germen, supporting a slender style, crowned by a bifid acute stigma. The germen afterward becomes a single seed, crowned with a long feathery down, sitting in the common empalement.

This genus of plants is ranged in the fifth section of Linnæus's nineteenth class, which includes those plants whose flowers have many partial empalements included in the common one.

We have but one **SPECIES** of this genus, viz.

STOEBE (*Æthiopica*.) Hort. Cliff. 360. *Stæbe*. Helichrysoides juniperi creberrimis aduncis foliis, floribus in ramulorum cymis Vaill. Aët. Par. 1719. *Bastard Elichrysum* with crooked Juniper leaves, and flowers growing at the tops of the branches.

This plant grows naturally at the Cape of Good Hope; it is a perennial plant, with a ligneous stalk which rises two or three feet high, sending out slender branches from the sides, which are garnished with short linear leaves that are for the most part hooked; they are of a grayish colour, and placed irregularly round the branches; the flowers are produced in single heads at the end of the branches; they are of a pale yellow colour, and are composed of several hermaphrodite florets, each having a separate cup, included in one common empalement, whose scales lie over each other like those of fish. The florets are single, and peep out between the scales of the empalement. This plant flowers in August, but seldom produces good seeds in England.

It is propagated by cuttings or slips, which should be planted in July upon a bed of soft loam, and covered close down either with a bell or hand-glass, shading them every day from the sun till they have taken root; then they must be gradually inured to the open air, and afterward taken up, and planted in pots, placing them in the shade till they have taken new root; then they may be placed in a sheltered situation with other tender exotic plants, and in autumn they must be removed into shelter, for they are too tender to live through the winter in the open air in England.

STOECHAS. Tourn. Inst. R. H. 201. tab. 95. *Lavendula*. Lin. Gen. Plant. 630 [so called from certain isles in the Mediterranean Sea, belonging to the French, where this plant was first found. In the shops it is called *Stœchas Arabica*, not because it grows there, but because the Arabian physicians highly commend this herb.] Cassidony, French Lavender, or Stickadore.

The **CHARACTERS** are,

The flower has an oval permanent empalement of one leaf, whose brim has some obscure indentures; it is of the lip kind with one petal, having a cylindrical tube longer than the empalement, whose brim spreads open. The upper lip is large, bifid, and open; the under lip is cut into three roundish almost equal segments. It has four

stamina within the tube, which are turned aside, two of which are shorter than the other, terminated by small summits, and a quadrifid germen supporting a slender style the length of the tube, crowned by an obtuse indented stigma. The germen afterward turn to four almost oval seeds which ripen in the empalement, to which the following notes must be added: the flowers are ranged in several series, and the spikes are terminated by tufts of leaves.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, joining it to *Lavendula*, which contains those plants whose flowers have two long and two shorter stamina, and the seeds are naked.

The SPECIES are,

1. *STOECHAS (Officinarum)* foliis lanceolato-linearibus, pedunculis brevioribus. *Stœchas* with spear-shaped linear leaves, and shorter foot-stalks to the flowers. *Stœchas purpurea*. C. B. P. 216. *Purple Stœchas, or common French Lavender.*
2. *STOECHAS (Pedunculatus)* foliis lanceolato-linearibus, pedunculis longissimis. *Stœchas* with spear-shaped linear leaves, and the longest foot-stalks to the flowers. *Stœchas cauliculis non foliosis*. C. B. P. 216. *Stœchas without foot-stalks and leaves.*
3. *STOECHAS (Dentatus)* foliis pinnato-dentatis. *Stœchas* with winged indented leaves. *Stœchas folio serrato*. C. B. P. 216. *Stœchas with a sawed leaf.*

The first sort grows naturally in the south of France and Spain, from whence the tops or heads of flowers are imported to England for medicinal use: this has a low, thick, shrubby stalk, which rises about two feet high, sending out ligneous branches the whole length, which are garnished with spear-shaped linear leaves about an inch long, which are hoary and pointed, of a strong aromatic scent, and stand opposite on the branches at each joint, with smaller leaves of the same shape coming out at the same places. The branches are terminated with scaly spikes of purple flowers about an inch in length; the spikes are four-cornered; the scales lie over each other like those of fish; out of each scale peeps one lip flower, whose tube is the length of the scale, so the two lips only appear; the under is spread open, and the upper stands erect. The spike of flowers is terminated by a small tuft of purple leaves like the Clary of Matthioli; the flowers appear in May and June, which are succeeded by oval seeds which ripen in August. The whole plant has a very strong, aromatic, agreeable odour.

The heads of flowers of this kind are used in some of the capital medicines directed by the College of Physicians, which are commonly brought from the south of France, where the plants are in great plenty; but, as these are seldom imported, and very little care taken in the drying and packing them, they are very apt to take a mouldiness in their passage, and are not near so good for use as those which are gathered fresh in England, where the plants may be cultivated to great advantage.

The second sort grows naturally in Spain. The difference between this and the first consists in the foot-stalks, which sustain the spikes of flowers, being three times the length of those of the first, and naked, having no leaves. The spikes of flowers are longer and not so thick, and they have more coloured leaves on their tops, which are longer, and of a brighter purple colour. These differences are not accidental, for I have many years propagated this plant by seeds, and have always found them the same. The flowers, seeds, and other parts are the same. Of both these there are some plants which vary in the colour of their flowers, some producing white, and others purplish flowers, but the most common colour is blue. These plants may be cultivated by sowing their seeds upon a bed of light dry soil in March, and when they come up, they should be carefully cleared from weeds until they are two inches high, at which time they should be removed; therefore there must be a spot of light dry ground prepared, and laid level, which must be trodden out in beds, into which the plants should be planted at about five or six inches distance each way, observing to water and shade them

until they have taken root, after which they will require no further care but to keep them clear from weeds the following summer; but, if the winter should prove severe, it will be proper to cover them with mats, Peas-haulm, or some other light covering, to guard them against the frost, which otherwise would be apt to injure them while they are so young; but in March, or the beginning of April, the following spring, they must be removed into the places where they are to remain, observing if possible, to transplant them in a warm moist season, and not let them remain long above ground, for if their roots are dried they seldom grow well after. The soil in which these are planted should be a dry warm sand or gravel, and the poorer the soil is in which they are planted, the better they will endure the cold of the winter, provided the ground be dry; though indeed the plants will thrive better in summer upon a rich moist ground, but then they will not produce so many flowers, nor will the heads or spikes have near so strong an aromatic scent, as is the case with most sorts of aromatic plants.

These plants may also be propagated by planting slips or cuttings of any of the kinds in the spring, observing to refresh them with water until they have taken root, after which they may be managed as hath been directed for the seedling plants; but, as those plants raised from seeds are much better than these, it is hardly worth while to propagate them this way, especially since their seeds ripen so well in this country. The heads of the first sorts may be gathered for use, when the flowers are in full perfection, and spread to dry in a shady place, after which they may be put up for use.

The third sort grows naturally in Andalusia in Spain, and also about Murcia; this has a ligneous stalk which rises two or three feet high, furnished with branches on every side the whole length, which are four-cornered, and garnished with leaves placed opposite by pairs, which are about an inch long, and an eighth of an inch broad, indented regularly on both sides almost to the midrib, in form of winged leaves; they are of a grayish colour, have a pleasant aromatic odour, and biting warm taste. The flowers are produced in scaly spikes at the end of the branches, standing upon long naked foot-stalks; the spikes are four-cornered, hairy, and about an inch long, terminated by a few purplish leaves in the like manner as the other sorts, which inclined me to keep it joined to them. It flowers great part of summer, but the seeds very rarely ripen in England.

As this plant seldom produces seeds in England, it is propagated by slips or cuttings, which, if planted in April, and treated in the same way as those of the two other sorts, will take root very freely; but these plants, when rooted, must be planted in pots, that they may be sheltered from severe frost in winter, because they are too tender to live in the open air through the winter in England, especially while they are young; but when they have obtained strength, some of them may be turned out of the pots, and planted in a warm situation, upon a dry rubbishy soil, where they will be stunted from growing too vigorously, so will endure the cold much better than if they were growing in better ground.

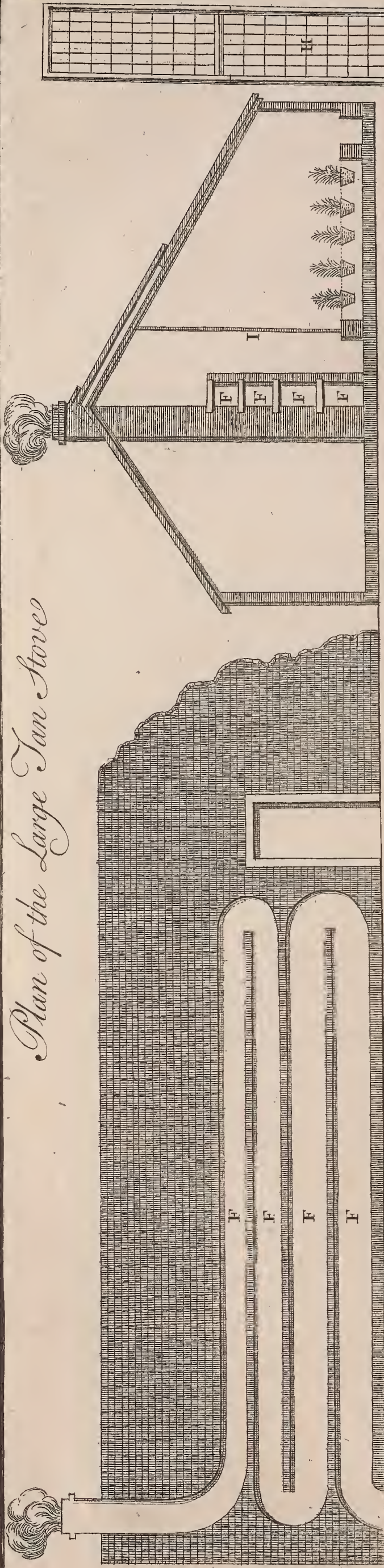
STONECROP. See *SEDUM*.

STONECROP-TREE. See *CHENOPODIUM*.

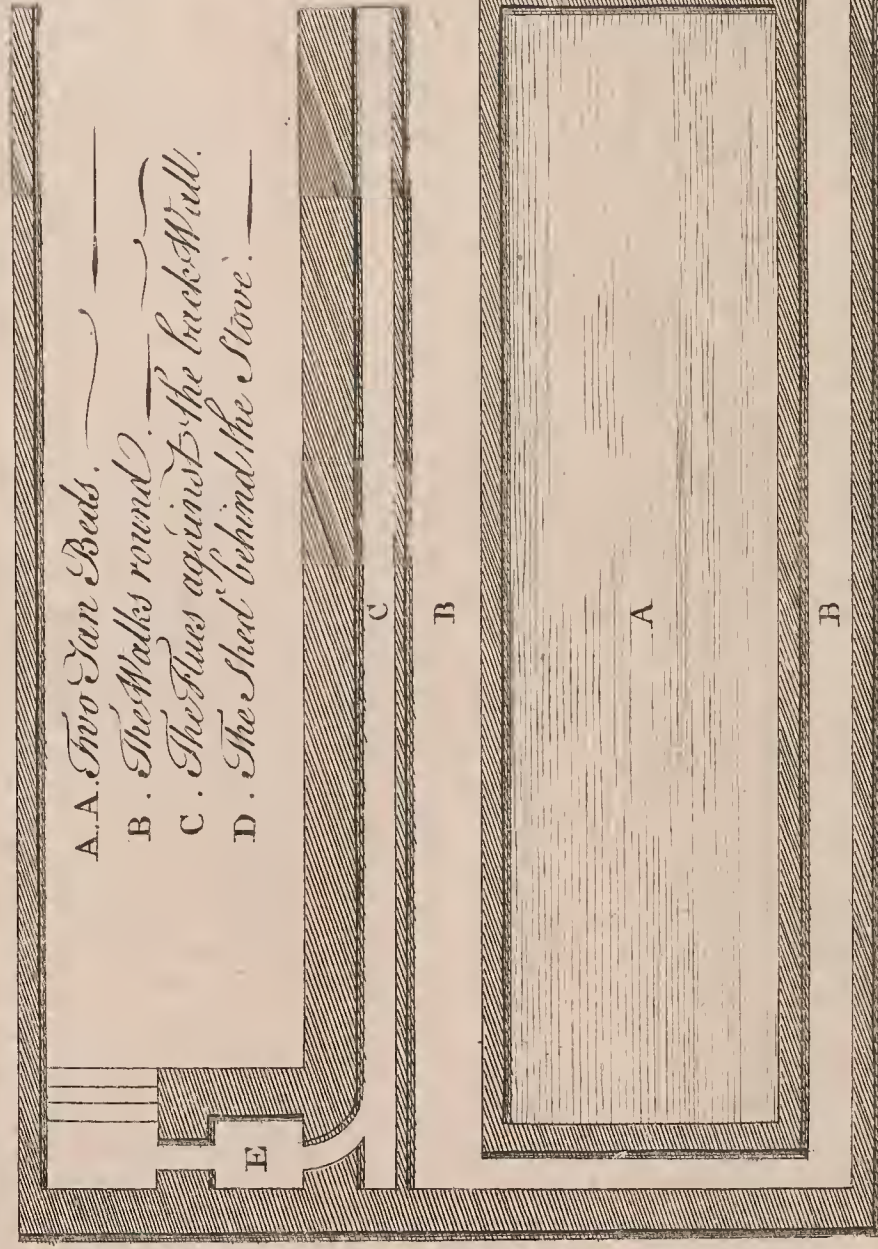
STOVES are contrivances for the preserving such tender exotic plants, which will not live in these northern countries without artificial warmth in winter. These are built in different methods, according to the ingenuity of the artist, or the different purposes for which they are intended, but in England they are at present reducible to two or three.

The first is called a dry Stove, being so contrived, that the flues, through which the smoke passes, are either carried under the pavement of the floor, or else are erected in the back part of the house, over each other, and are returned six or eight times the whole length of the Stove, according to the height. In these

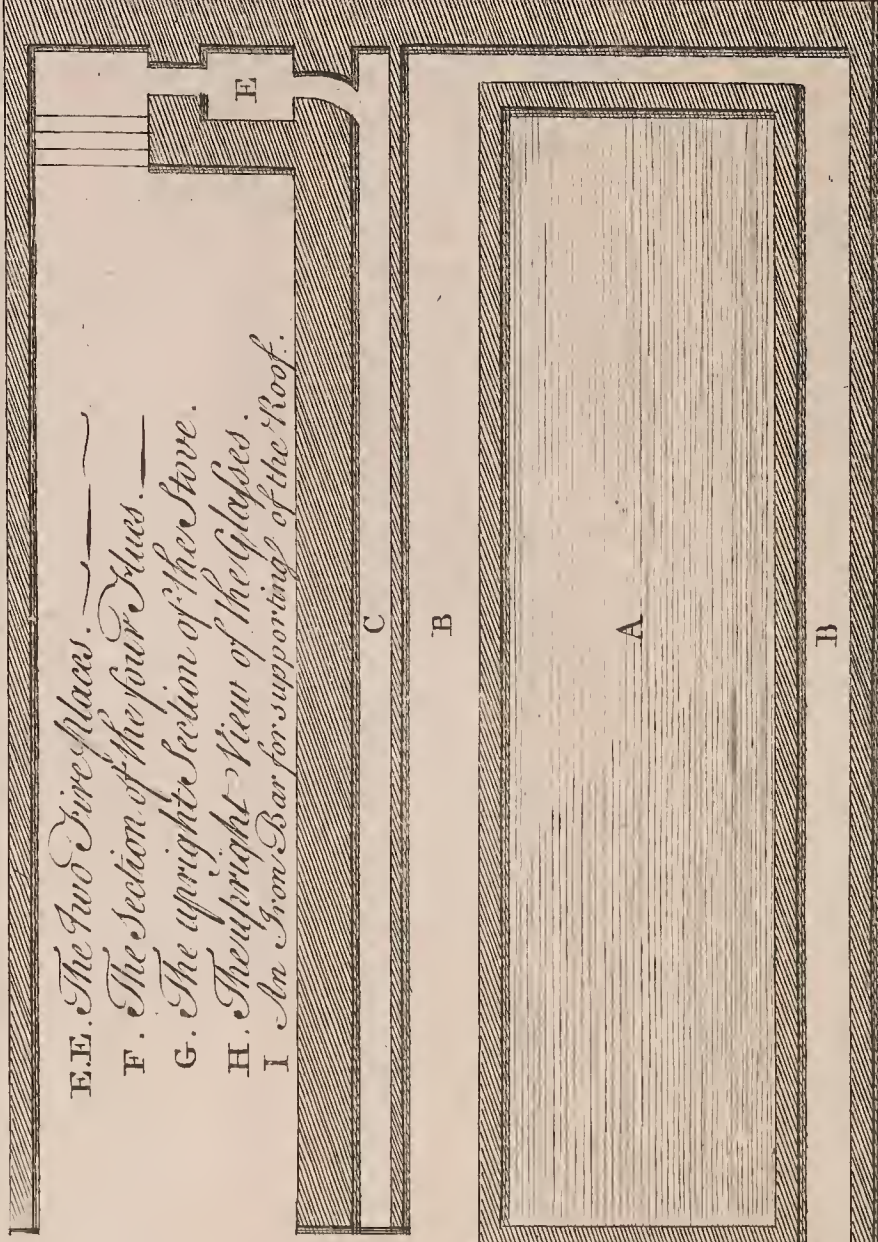
Plan of the Large Tan Stove



- A. A. Two Tan Beds.
- B. The Walks round.
- C. The Flues against the back Wall.
- D. The Shed behind the Stove.



- E. E. The Two Fire Places.
- F. The Section of the four Flues.
- G. The upright Section of the Stove.
- H. The upright View of the Glazes.
- I. An Iron Bar for supporting of the Roof.



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these Stoves the plants are placed on shelves of boards laid on a scaffold, rising above each other like the seats in a theatre, for the greater advantage of their standing in light, and enjoying an equal share of light and air. In these Stoves are commonly placed the tender sorts of Aloes, Cereuses, Euphorbiums, Tithymals, and other succulent plants, which are impatient of moisture in winter, and therefore require for the most part to be kept in a separate Stove, and not placed among trees or herbaceous plants, which perspire freely, and thereby often cause a damp air in the house, which is imbibed by the succulent plants to their no small prejudice. These Stoves may be regulated by a thermometer so as not to over-heat them, nor let the plants suffer by cold; in order to which, all such plants as require nearly the same degree of heat, should be placed by themselves in a separate house, for if in the same Stove there are plants placed of many different countries, which require as many different heats, by making the house warm enough for some plants, others, by having too much heat, are drawn and spoiled.

The other sort of Stoves are commonly called bark Stoves, to distinguish them from the dry Stoves already mentioned. These have a large pit, nearly the length of the house, three feet deep, and six or seven feet wide, according to the breadth of the house; which pit is filled with fresh tanners bark to make a hot-bed, and in this bed the pots of the most tender exotic trees and herbaceous plants are plunged. The heat of this bed being moderate, the roots of the plants are always kept in action, and the moisture detained by the bark, keeps the fibres of their roots in a ductile state, which in the dry Stove, where they are placed on shelves, are subject to dry too fast, to the great injury of the plants. In these Stoves, if they are rightly contrived, may be preserved the most tender exotic trees and plants, which, before the use of the bark was introduced, were thought impossible to be kept in England; but, as there is some skill required in the structure of both these Stoves, I shall not only describe them as intelligibly as possible, but also annex plans of both Stoves hereto, by which it is hoped every curious person will be capable of directing his workmen in their structure.

The dimension of these Stoves should be proportioned to the number of plants intended to be preserved, or the particular fancy of the owner, but their length should not exceed forty feet for one fire-place; but where there are two fires it will be proper to make a partition of glass in the middle, and to have two tan-pits, that there may be two different degrees of heat for plants from different countries (for the reasons before given in the account of dry Stoves;) and were I to erect a range of Stoves, they should be all built in one, and only divided with glass partitions, at least the half way toward the front, which will be of great advantage to the plants, because they may have the air in each division shifted by sliding the glasses of the partitions, or by opening the glass door which should be made between each division, for the more easy passage from one to the other. These Stoves should be raised above the level of the ground, in proportion to the dryness of the place, for if they are built on a moist situation, the whole should be placed upon the top of the ground, so that the brick-work in front must be raised three feet above the surface, which is the depth of the bark-bed, whereby none of the bark will be in danger of lying in water; but if the soil be dry, the brick-work in front need not be more than one foot above ground, and the pit may be sunk two feet below the surface. Upon the top of this brick-work in front must be laid the plate of timber, into which the wood-work of the frame is to be mortised; this should be of sound Oak felled in winter, without sap, the dimension one foot wide, and six inches deep, and the upright timbers in front must be placed four feet asunder, or somewhat more, which is the proportion of the width of the glass doors or sashes; these should be about six feet and a half,

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or seven feet long, and placed upright; their dimension should be nine inches by six, of yellow Fir; but from the top of these should be sloping glasses, which should reach within three feet of the back of the stove, where there should be a strong crown-piece of timber placed, in which there should be a groove made for the glasses to slide into; the dimension of the sloping timbers should be ten inches by nine of yellow Fir, and the crown-plate one foot by nine or ten inches of the same timber. The wall in the back part of the Stove should be at least thirteen inches thick, but eighteen or twenty-two inches, which is two bricks and a half, will be better, for the greater thickness there is in the back wall, the more heat will be thrown to the front, whereby the air of the Stove will be better warmed, and the building will be so much stronger; for to this back wall the flues, through which the smoke is to pass, must be joined. This back wall should be carried up about sixteen or twenty feet high, or more for tall Stoves, that they may be of a proper height to support the timbers of the back roof, which covers the shed behind the Stove. The roof is fastened into the crown-piece before-mentioned, which in tall Stoves should be about thirty feet above the surface of the tan-bed, which will give a sufficient declivity to the sloping glasses to carry off the wet, and be of a reasonable height for containing many tall plants. The back roof may be slated, covered with lead, or tiled, according to the fancy of the owner; but the manner of the outside building is better expressed by the annexed plan, than is possible to be described in words.

In the front of the house, before the tan-bed, there should be a walk, about two feet wide, for the convenience of walking; next to which the bark-pit must be placed, which should be in width proportionable to the breadth of the house. If the house is fourteen feet wide, which is a due proportion, the pit may be eight feet wide, and behind the pit should be a walk two feet wide, to pass, in order to water the plants, &c. then there will be two feet left next the back wall to erect the flues, which must be all raised above the level of the bark-bed. These flues ought to be one foot wide in the clear, that they may not be too soon stopped with the foot, as also for the more conveniently cleaning them; the lower flue, into which the smoke first enters from the fire, should be two feet deep in the clear; this should be covered with broad tiles, which should be a foot and a half square, or one foot by a foot and a half long, that they may be wide enough to extend over the wall in front of the flues, and to take sufficient hold of the back wall; over this the second flue must be returned back again, which may be twenty inches deep, and covered on the top as before; and so in like manner the flues may be returned over each other six or eight times, that the heat may be spent before the smoke passes off. The thickness of the wall in front of these flues need not be more than four inches, or three will do very well if they are carefully carried up, but it must be well jointed with mortar, and pargeted within side to prevent the smoke from getting into the house: the outside should be faced with mortar, and covered with a coarse cloth, to keep the mortar from cracking, as is practised in setting up coppers. If this be carefully done, there will be no danger of the smoke entering the house, which cannot be too carefully guarded against, for there is nothing more injurious to plants than smoke, which will cause them to drop their leaves, and, if it continue long in the house, will entirely destroy them. The fire-place must be made at one end, where there is but one; but, if the Stove is so long as to require two, they should be placed at each end of the shed, which must be made the length of the Stove, that the fires and the back of the flues may not suffer from the outer air; for it will be impossible to make the fires burn equally, where the wind has full ingress to it, and it will be troublesome to attend the fire in wet weather, where it is exposed to the rain.

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The contrivance of the furnace must be according to the fuel which is designed to burn, but as turf is the best firing for Stoves, where it can be had cheap, many prefer it, because it lasts longer than any other sort of fuel, and so requires less attendance, I shall describe a proper sort of furnace for that purpose.

The whole of this furnace should be erected within the house, which will be a great addition to the heat, and the front-wall on the outside of the fire-place, next the shed, should be three bricks thick, the better to prevent the heat from coming out that way. The door of the furnace, at which the fuel is put in, must be as small as conveniently may be to admit of the fuel; and this door should be placed near the upper part of the furnace, and made to shut as close as possible, so that there may be but little of the heat pass off through it. This furnace should be about twenty inches deep, and sixteen inches square at bottom, but may be sloped off on every side, so as to be two feet square at the top, and under this furnace should be a place for the ashes to fall into, which should be about a foot deep, and as wide at the bottom of the furnace; this should also have an iron door to shut as close as possible, but just over the ash hole, above the bars which support the fuel, should be a square hole about four or six inches wide to let in air to make the fire burn: this must also have an iron frame, and a door to shut close when the fire is perfectly lighted, which will make the fuel last longer, and the heat will be more moderate.

The top of this furnace should be nearly equal to the top of the bark-bed, that the lowest flue may be above the fire, so that there may be a greater draught for the smoke, and the furnace should be arched over with bricks. The best materials for this purpose are what the bricklayers call Windsor bricks, which should be laid in loam of the same kind as the bricks are made with, which, when burnt by the fire, will cement the whole together, and become like one brick; but you should be very careful, wherever the fire is placed, that it be not too near the bark-bed, for the heat of the fire will, by its long continuance, dry the bark, so that it will lose its virtue, and be in danger of taking fire; to prevent which, it will be the best method to continue a hollow, between the brick-work of the fire and that of the pit, about four or five inches wide, which will effectually prevent any damage arising from the heat of the fire; nor should there be any wood-work placed near the flues, or the fire-place, because the continual heat of the Stove may in time dry it so much as to cause it to take fire, which should be very carefully guarded against.

The entrance into this Stove should be either from a green-house, the dry Stove, or else through the shed where the fire is made, because in cold weather the front-glasses must not be opened. The inside of the house should be clean and white-washed, because the whiter the back part of the house is, the better it will reflect the light, which is of great consequence to plants, especially in winter, when the Stove is obliged to be shut up close.

Over the top sliding-glasses there should be either wooden shutters, or tarpaulins fixed in frames to cover them in bad weather, to prevent the wet from getting through the glasses, and to secure them from being broken by storms of hail, and these outer coverings will be very serviceable to keep out the frost; and if in very severe cold there is a tarpaulin hung before the upright glasses in the front, it will be of great service to the Stove, for then much less fire will preserve a heat in the house.

In the warmest of these houses or divisions should be placed the most tender exotic trees and plants, a list of which followeth:

Acajou, or Cashew,	Bananas,
Ahouai,	Bastard Cedar of Barbadoes,
Allegator Pear,	
Allspice, or Pimento,	Bastard Locust of Barbadoes,
Arrow-root,	

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Bully-tree,	Logwood,
Button-wood of Barbadoes,	Macaw-tree,
	Mamee-tree,
Cabbage-tree,	Manchineel-tree,
Cocoa-tree,	Mimosa, or Sensitive Plants,
Calabash-tree,	Nickar-tree, or Bonduc,
Cassada,	Palm-trees, of several sorts,
Cherry-tree of Barbadoes,	Papaw-tree,
Cocoa-nut-tree,	Plantain-tree,
Cortex Winteranus,	Plum-tree of Jamaica,
Custard-apple,	Hog-plum,
Date-tree,	Sapotilla-tree,
Dumb Cane,	Santa Maria,
Fiddle-wood,	Sour Sop,
Fig-tree, the arched Indian,	Sugar-Apple,
Flower-fence of Barbadoes,	Sweet Sop,
Fustic-tree,	Tamarind-tree,
Ginger,	Tulip-flower, or White-wood.
Guaiacum,	

These with most other sorts of trees, shrubs, and herbaceous plants, which are natives of very warm countries, should be plunged in the bark-bed for the reasons already assigned, and over the flues may be a conveniency made to set the Melon Thistle, the tender sorts of Cereuses, and Euphorbiums, with other very tender succulent plants, which require to be kept dry in winter.

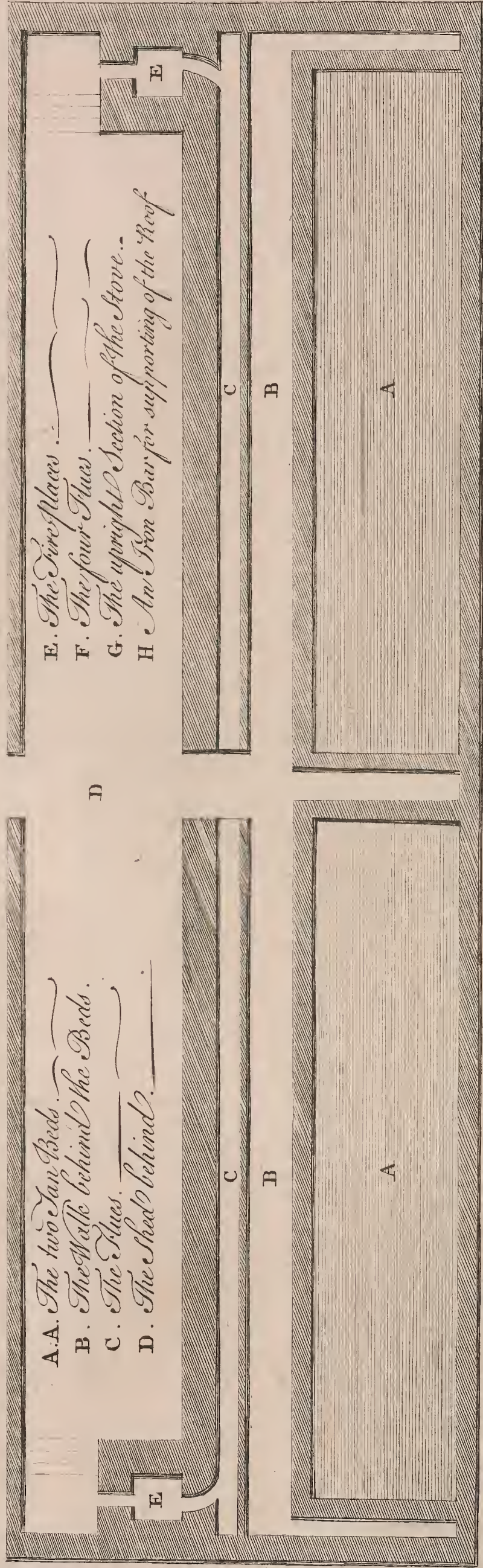
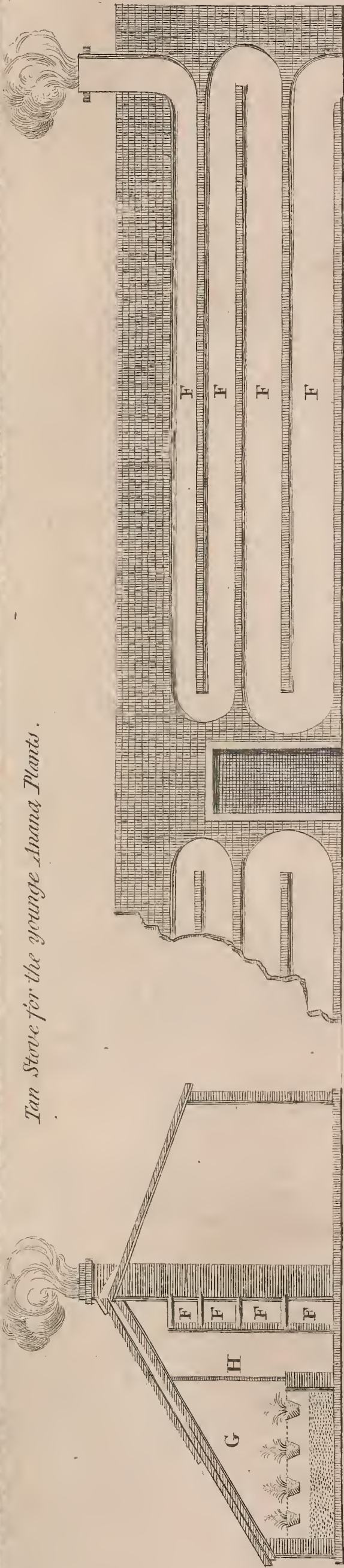
As in this Stove are placed the plants of the hottest parts of the East and West-Indies, the heat should be kept up equal to that marked Anana upon the botanical thermometers, and should never be suffered to be above eight or ten degrees cooler at most; nor should the spirit be raised above ten degrees higher in the thermometer during the winter season, both which extremes will be equally injurious to the plants.

But in order to judge more exactly of the temper of the air in the Stove, the thermometer should be hung at a good distance from the fire; nor should the tube be exposed to the sun, but, on the contrary, as much in shade as possible; because, whenever the sun shines upon the ball of the thermometer but one single hour, it will raise the liquor in the tube considerably, when perhaps the air of the house is not near so warm, which many times deceives those who are not aware of this.

In the management of the plants placed in the bark-bed, there must be a particular regard had to the temper of the bark, and the air of the house, that neither be too violent; as also to water them frequently, but sparingly in cold weather, because when they are in continual warmth, which will cause them to perspire freely, if they have not a proper supply to answer their discharge, their leaves will decay, and soon fall off. As to the farther directions concerning the culture of the particular plants, the reader is desired to turn to their several articles, where they are distinctly treated of.

The other sort of Stove, which is commonly called the dry Stove, as was before said, may be either built with upright and sloping glasses at the top, in the same manner, and after the same model of the bark Stove, which is the most convenient; or else the front glasses, which should run from the floor of the ceiling, may be laid sloping, to an angle of 45 degrees, the better to admit the rays of the sun in spring and autumn, when the sun declines. The latter method has been chiefly followed by most persons who have built these sorts of Stoves, but where I have had the contrivance of Stoves of this kind, I have always built them after the model of the bark Stove, with upright glasses in front, and sloping glasses over them, because this will more easily admit the sun at all the different seasons; for in summer, when the sun is high, the top glasses will admit the rays to shine almost all over the house, and in winter, when the sun is low, the front glasses will admit its rays; whereas, when the glasses are laid to any declivity in one direction, the rays of the sun will not fall directly thereon.

Tan Stove for the young Anana Plants.



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thereon above a fortnight in autumn; and about the same time in spring, and during the other parts of the year they will fall obliquely thereon; and in summer, when the sun is high, the rays will not reach above five or six feet from the glasses, for the proof of this see the article *Sun*. Besides, the plants placed toward the back part of the house, will not thrive in the summer season for want of air; whereas when there are sloping glasses at the top, which run within four feet of the back of the house, these, by being drawn down in hot weather, will let in perpendicular air to all the plants; and of how much service this is to all sorts of plants, every one who has had opportunity of observing the growth of plants in a Stove, will easily judge; for when plants are placed under cover of a cieling, they always turn themselves toward the air and light, and thereby grow crooked; and if in order to preserve them strait, they are turned every week, they will nevertheless grow weak, and look pale and sickly; for which reasons, I am sure, whoever has made trial of both sorts of Stoves, will readily join with me to recommend the model of the bark Stove for every purpose.

As to the farther contrivance of this Stove, it will be necessary to observe the temper of the place, whether the situation be dry or wet; if it be dry, then the floor need not be raised above two feet above the level of the ground; but if it be wet, it will be proper to raise it three feet, especially if these flues are to be carried under the floor; for when they are erected close upon the surface of the ground, these will raise a damp, which will prevent the flues drawing so well as when they are more elevated. The furnace of this Stove must be placed at one end of the house, according to the directions before given. This must be made according to the fuel intended to burn, which, if for coals or wood, may be made according to the common method for coppers, but only much larger; because, as the fire is to be continued in the night chiefly, if there is not room to contain a proper quantity of fuel, it will occasion a great deal of trouble in attending upon the fire in the night, which should be avoided as much as possible; because, whenever the trouble is made very great or difficult, and the person who is intrusted with the care of it, has not a very great affection for the thing, and is withal not very careful, there will be great hazard of the fire being neglected, which in a little time may be of dangerous consequence to the plants; but, if the fuel intended be turf, then the contrivance of the furnace may be the same as for the bark Stove already mentioned. The flues of this Stove, if they are carried under the pavement, may be turned after the following manner,

which will cause them to draw better than if strait, and by this method of disposing them, they may be so much turned as to reach almost from the back to the front of the house.

The depth of them should not be less than eighteen inches, and the width nearly equal, which will prevent their being choaked up with soot, as is often the case when the flues are made too small. The spaces between the flues should be filled up either with dry brick rubbish, lime, or sand, from which there will little moisture arise; and the flues should be closely plaistered with loam both within and without, and the upper part of them covered with a coarse cloth under the floor, to prevent the smoke from getting into the house.

When the flue is carried from the furnace to the end of the house, it may be returned in the back above the floor twice in strait lines, which may be contrived to appear like a step or two, by which means the smoke will be continued in the house until all its heat is spent, which will consequently warm the air of the house the better; and the chimneys, through which

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the smoke is to pass off, may be either at both ends, or in the middle, carried up in the thickness of the brick work of the flues, so as not to appear in sight in the house. The flues should be first covered with broad tiles sixteen inches long, and then a bed of sand laid over them about two inches thick, upon which the other tiles should be laid to correspond with the rest of the floor. This thickness of cover will be full enough to prevent the too sudden rise of the heat from the flues.

But if the furnace is placed under the floor, the thickness of sand between the brick arch which covers it and the floor, should not be less than four or six inches, so that the bottom of the furnace should be sunk the lower; and if from the fire-place to the end of the house, the flues are laid a little rising, it will cause them to draw the better; but this rise must be allowed in the placing them lower under the floor next the fire, because the floor must be laid perfectly level, otherwise it will appear unsightly.



In this Stove there should be a stand or scaffold erected for placing shelves above each other, in the manner annexed, that the plants may be disposed above each other, so as to make a handsome appearance in the house; but these shelves should be made moveable, so as to be raised or sunk, according to the various heights of the plants, otherwise it will be very troublesome to raise or sink every particular plant according to their heights, or every year as they advance in their growth.

In placing the feet of this stand you must be careful not to set them too near the fire, nor directly upon the top of the flue, especially that end next the fire, lest by the constant heat of the tiles the wood should take fire, which cannot be too much guarded against; since such an accident would go near to destroy all the plants, if the house escaped being burnt. This stand or scaffold should be placed in the middle of the house, leaving a passage about two feet and a half in the front, and another of the same width in the back, for the more conveniently passing round the plants to water them, and that the air may freely circulate about them. In disposing the plants, the tallest should be placed backward, and the smallest in front, so that there will not be occasion for more than five or six shelves in height at most; but the scaffold should be so contrived, that there may be two shelves in breadth laid upon every rise whenever there may be occasion for it, which will save a deal of trouble in disposing of the plants.

In the erection of these Stoves, it will be of great service to join them all together with only glass partitions between them, as was before observed: and where several of these Stoves and green-houses are required in one garden, then it will be very proper to have the green-house in the middle, and the Stoves at each end, either in the manner directed in the plan of the green-house exhibited in that article, or carried on in one strait front.

By this contrivance in the structure of these houses, a person may pass from one to the other of them, without going into the open air; which, besides the pleasure to the owner, is also of great use, because there will be no occasion of making a back-way into each of them, which otherwise must be, since the front glasses of the Stove should not be opened in cold weather, if it can possibly be avoided on any account, otherwise the cold air rushing in, will greatly prejudice the very tender plants.

But besides the Stoves here described, and the green-house, it will be very necessary to have a glass-case or two, wherever there are great collection of plants. These may be built exactly in the manner already described for the Stoves, with upright glasses in front, and sloping glasses over the top of them, which should run within four feet of the back of the house. The height, depth, and other dimensions, should be conformable to that of the Stoves, which will make a regularity in the building. These may be placed at

the end of the range on each hand beyond the Stoves; and if there be a flue carried along round each of these, with an oven to make a fire in very cold weather, it will save a great deal of labour, and prevent the frost from ever entering the house, be the winter ever so severe; but the upper glasses of these houses should have either shutters of wood, or tarpaulins in frames to cover them in frosty weather; and if there is a contrivance to cover the upright glasses in frost, either with mats, shutters, or tarpaulins, it will be of great use in winter, otherwise the flue must be used when the frost comes on, which should only be done upon extraordinary occasions; because the design of these houses is, to keep such plants as require only to be preserved from frost, and need no additional warmth; but at the same time, require more air than can conveniently be given them in a green-house. In one of these houses may be placed all the sorts of Ficoides, African Sedums, Cotyledons, and other succulent plants from the Cape of Good Hope. In the other may be placed the several kinds of Arctotis, Osteospermum, Royena, Lotus, and other woody or herbaceous plants from the same country, or any other in the same latitude.

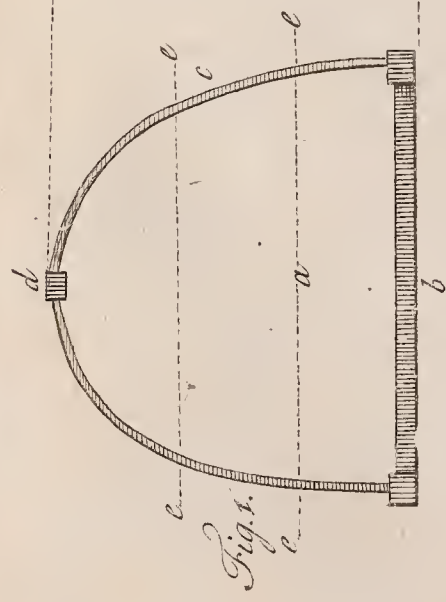
Thus by contriving the green-house in the middle, and one Stove and a glass-case at each end, there will be a conveniency to keep plants from all the different parts of the world, which can be no otherwise maintained but by placing them in different degrees of heat, according to the places of their native growth. The Stoves before described are such as are usually built to maintain exotic plant, which will not live in England, unless they enjoy a temperature of air, approaching to that of the several countries from whence they are brought; therefore, whoever is inclinable to preserve a large collection of plants from different countries, must contrive to have two or three of these Stoves, each of which should be kept in a different temperature of warmth; and the plants should be also adapted to the several degrees of heat, as they shall require to preserve them; but for the better information of those persons who are not conversant in this business, there is a list of plants added by way of appendix to this; in which the plants are ranged according to the different degrees of heat which they require to be preserved in this country, to which the reader is desired to turn for his further information: and as the far greatest number of Stoves which have been erected in England, are designed for the culture of the Ananas only, so I shall add a description and plans of two sorts of Stoves, of the least expence in building for this purpose; so that whoever is inclinable to erect a Stove for ripening of the Ananas, may, by attending to the plans and descriptions, direct the building and contriving such Stoves as they are desirous to have, or according to the number of fruit proposed to be ripened annually.

The first sort of Stove is that which is designed for the plants, which produce the fruit the same year; for as the plants do not generally fruit until the second year from their being taken from the old plants, whether they are suckers from the side of the plants or crowns taken from the fruit, if they fruit the succeeding year, the fruit will be small; therefore when they are properly managed, they will not produce their fruit until the second year, by which time they will have obtained strength to produce large fruit, in which their greatest value consists; for although there are several varieties of this fruit, which differ in degrees of goodness, as in most other fruits, yet they may all of them be improved in their size, without diminishing of their excellence in taste; tho' I know there are some persons of a contrary opinion, and who believe that the small fruit are always better flavoured than the large; but from long experience I can assert, that the larger and better nourished this fruit is, the higher will be its flavour, supposing the sorts are the same; therefore every person who cultivates this fruit, should endeavour to have it improved to the greatest perfection; in order to which it will

be proper to have a small Stove, in which the young plants may be placed to bring them forward for fruiting, and the following autumn they should be removed into the larger Stove for ripening: but I shall return to the description of the larger Stove. The length of this must be proportionable to the quantity of fruit desired in one season, for as to their width, that should not be much varied; the tan-bed should never be narrower than six, nor should it be more than seven feet wide; for when it is more, there will be difficulty in reaching those plants which are in the middle of the bed, to water or clean them; and if there is room enough on each side of the bed for a walk a foot and a half broad, it will be sufficient for persons to water and do every thing which is necessary to the plants; and as these places are not designed for walking in, so it is to no purpose to have broad walks, which will take up too much space; and the fires must be larger, in proportion to the space of the house, otherwise the air cannot be kept in a proper temperature of warmth. If the Stove is made thirty-six feet long in the clear, then the tan-bed may be thirty-three feet long, and a walk left at each end a foot and a half wide, which will be sufficient to walk round the bed to water and attend the plants; and such a tan-bed will contain eighty fruiting plants very well if the bed is seven feet wide, and this stove may be very well warmed with one fire; but if the Stove is built much larger, there must be two fire-places contrived, one at each end, otherwise the air of the house cannot be kept in a proper temperature of heat. The quantity of fuel which will be wanting for a Stove of thirty-six feet long in the clear, is about three chaldron and a half of coals, or in such proportion for any other sort of fuel; when coals can be had reasonable, it is the best kind of fuel; and the pit or Scotch coal is preferable to the Newcastle coal, because the latter is very subject to melt or run into clinkers when the oven is very hot, which the pit coal never does, but always burns away with a white ash, making but little foot; so that the flues will not require to be so often cleaned, as when the other coal is used. The next best fuel for Stoves is peat, where it can be procured good, but the scent of this fuel is disagreeable to many people. There are some persons who burn wood in their Stoves, but this fuel requires much greater attendance than any other, therefore is not very proper for this purpose; but in the building of the Stoves, the ovens must be contrived for the sort of fuel which is to be used in them; but these will be afterwards described, and the places where they should be situated, are delineated in the plan.

The Stoves designed for ripening the fruit of the Ananas should have upright glasses in their front, which should be high enough to admit a person to walk upright under them on the walk in the front of the house; or where this cannot be admitted, the front walk may be sunk one foot lower than that on the back of the tan-bed, so that the surface of the bed will be a foot above the walk, which will be rather an advantage, as the plants will be so much nearer the glass; and a person may with great ease water and attend the plants when they are thus raised above the walk; therefore, when a Stove is so situated, as that the raising of it high above ground might be attended with inconvenience, the walks quite round the tan-bed may be sunk a foot or eighteen inches below the top of the bed, which will admit of the Stove being built so much lower; for if there is height for a person to walk under the glasses, it will be as much as is required; but as the flues, when returned four times against the back wall will rise near seven feet, so the bottom of the lower flue should be on the same level with the walk, to admit room enough for the whole under the roof. Over the upright glasses there must be a range of sloping glasses, which must run to join the roof, which should come so far from the back wall as to cover the flues, and the walk behind the tan-pit; for if the sloping glasses are of length sufficient to reach nearly over the bed, the plants will require

Two Sorts of Frames, with cycled Paper for Covering Melons.



Melo-

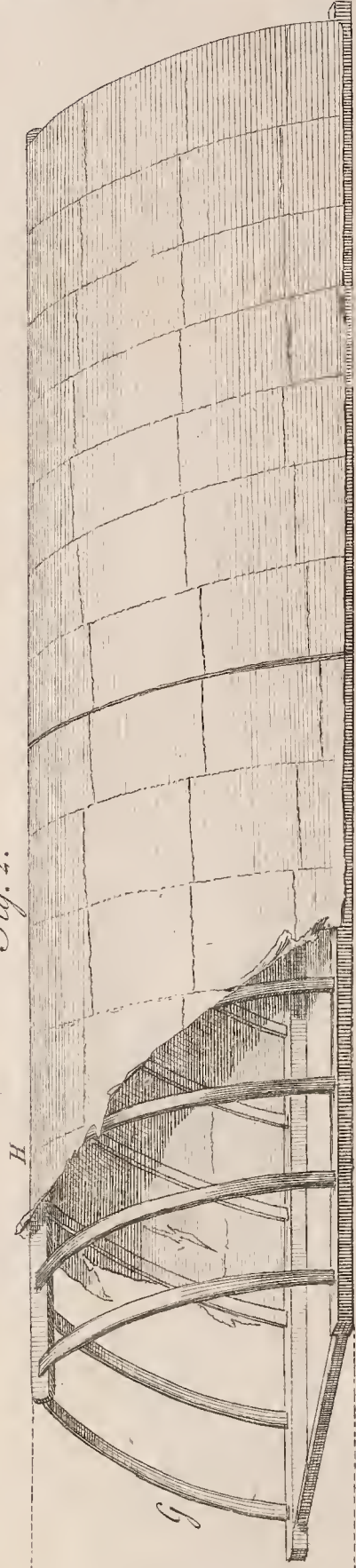


Fig. 4.

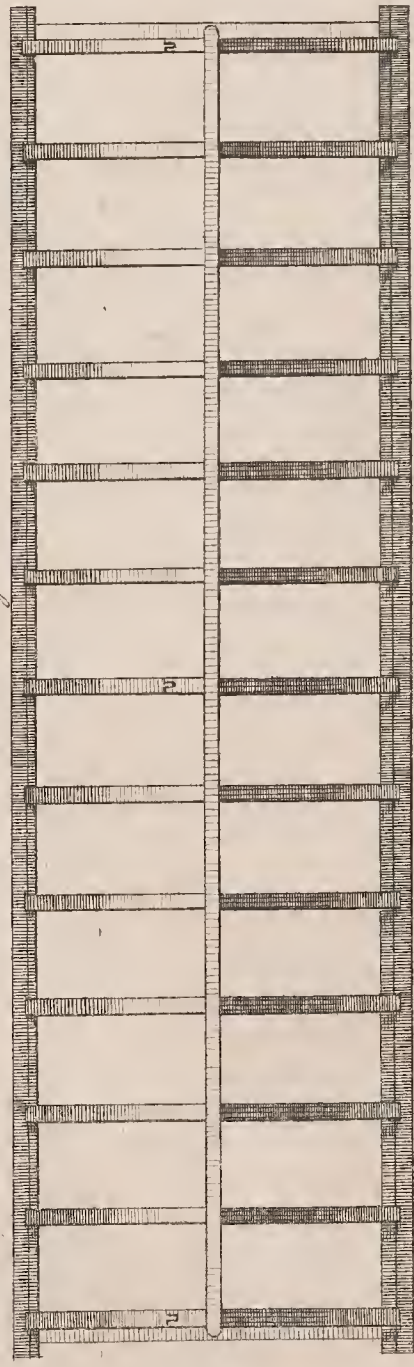
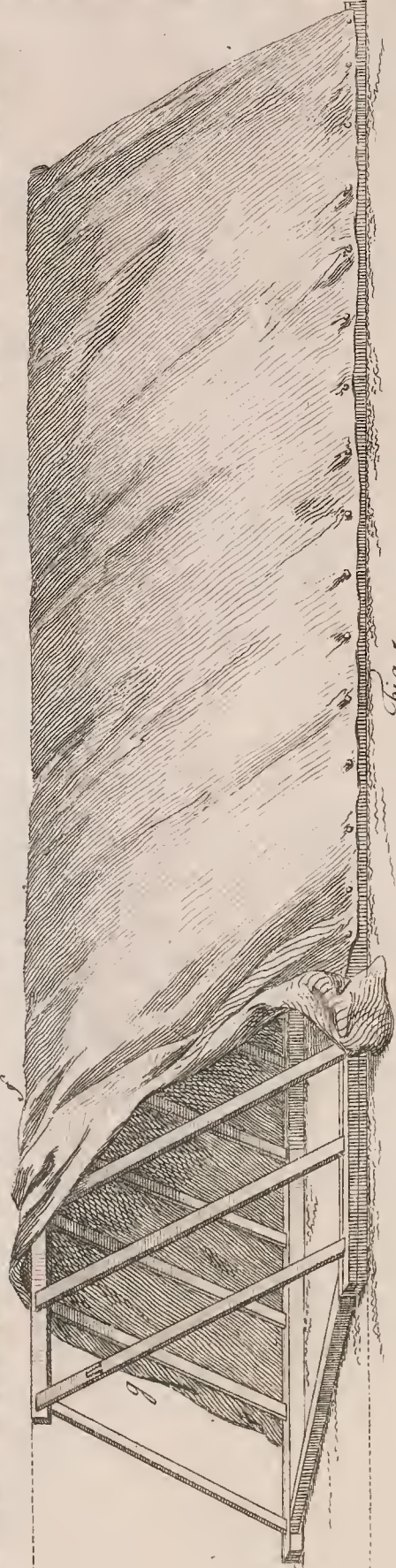
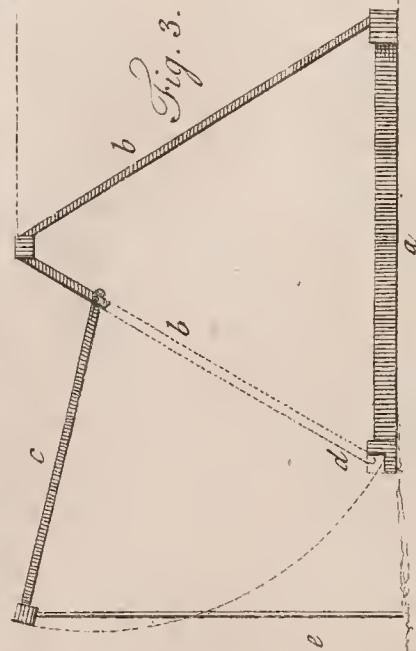
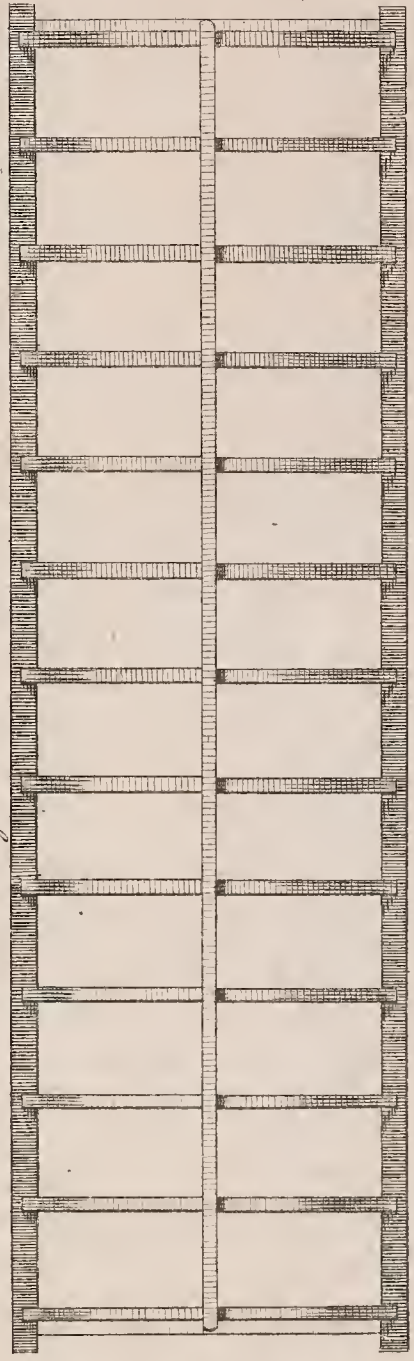


Fig. 4.



quire no more light; therefore these glasses should not be longer than is absolutely necessary, which will render them more manageable; but the annexed plan will render this more intelligible, than any written description can do.

The other sort of Stove, which is designed for raising of young plants until they are of a proper size to produce fruit, need not be built so high as the former, therefore there will not be wanting any upright glasses in the front; but the frames may be made in one slope, as in the annexed plan: indeed of late years, many persons have made tan-beds with two flues running through the back wall to warm the air in winter; and these beds have been covered with glasses, made in the same manner as those for common hot-beds, but larger; these were contrived to save expence, and have in many places answered the intention, but to these there are several objections. 1. That of having no passage into them, so that the glasses must be taken off when the plants want water, &c. 2. The damps very often rise in the winter season, when the glasses are closely shut, which often prove very injurious to the plants. 3. There is danger of the tan taking fire, where there is not great care taken that it doth not lie near the flues; so that although the small Stoves here proposed require more expence in their building, yet, being greatly preferable to those pits, and the after expence being the same, they will be found so much more convenient as to render them more general where this fruit is cultivated.

Where there is no danger of the wet settling about the tan in winter, the bark-pit may be sunk two feet deep in the ground, and raised one foot above the surface; the only walk which is necessary in these Stoves, is that on the back of the tan-bed, which may be on the level with the surface of the ground, so that the tan-bed will be more than one foot above the walk; and the flues beginning from the level of the walk, there will be room to return them three times, which will warm the air much more with the same fire than when they are carried but twice the length of the Stove.

But in wet land the tan-bed should be wholly raised above the level of the ground, in order to preserve the tan from being chilled by moisture; and in such places the walk on the back should be raised near two feet above the level of the ground, because the tan-bed should not rise much more than one foot above the walk; for if it is higher, it will be more difficult to reach the plants when they require water; the brick wall of the pit, on the side next the walk, need not be more than four inches thick, so far as rises above the walk, but below that it should be nine inches thick; the reason for reducing the wall above, is to gain room for the walk, which would otherwise be too much contracted; and if there is a kirb of Oak laid on the top of the four inch wall, it will secure the bricks from being displaced, and sufficiently strengthen the wall, which being but one foot above the walk, will not be in any danger of falling; and on this kirb there may be two or three upright iron bars fixed with claws, to support the crown-piece of timber, which will secure it from hanging in the middle, which in a great length is very often the case, where there are no supports placed under it: there may be more or less of these bars, according to the length of the Stove; but if they are about ten feet asunder, it will be near enough. If these iron bars are one inch square, they will be strong enough to answer the design.

But as it is hoped that the annexed plan of this small Stove will convey a clear idea of the whole contrivance, this will render it unnecessary to add any farther description here.

An Explanation of the Plate which represents the two sorts of frames with oiled paper for covering of Melons.

The first of these frames is contrived like the covers of waggons; it has a frame of wood at the base, to

which are fastened broad hoops which are bent over circularly, as is represented at fig. 1. The width of this frame should be from five to six feet, for less than five feet will not be sufficient to cover the bed, and if they are more than six feet broad, they will be too heavy and troublesome to move. *a* shews the section of the width, *b* the frame of wood at the base, *c* the arch of hoops, and *d* a small slip of wood which is fastened to the under side of the hoops to keep them in their proper position.

The distance between each hoop should not be more than one foot, and there should be two rows of strong packthread or rope-yarn on each side of the arch running from hoop to hoop at the places marked *e. e. e. e.* to keep the oiled paper from sinking down with wet. The length of each frame should not be much more than ten feet, which will be sufficient length for covering three plants, that being about the size of a three light frame, for if they are longer they will be heavy and troublesome to move; therefore there should be as many of these frames made, as may be necessary for covering the quantity of plants desired. Fig. 2. represents two lengths of these frames joined; *G.* shews the profile of the frame, and *H.* represents the paper turned back, that it may be seen how it is laid over the frame.

Fig. 3. represents the other sort of frame which is contrived like the roof of a house, *a* shews a section of the base; *b b* the two slopes, *c* one of the sides which is contrived to be raised at any time to admit air to the plants; *d* shews the place where this shuts down, and *e* the prop which supports it. If in the making of these frames every other light is made with hinges so as to be raised, and on the opposite side they are contrived to rise alternately, it will be a very good method, for then air may be given at the side contrary to the wind; and in very warm weather, when the plants require a large share of air, they may all be raised on both sides, which will make a thorough air to the whole bed. Fig. 4. shews the plan of these frames, and fig. 5. the same erected; *g* represents the profile of it, and *f* the covering of paper. This sort of frame may be made of pantile laths, or of slips of deal of like dimensions, because they should not be too heavy; but the base of the frame to which these are fastened, should be more substantial. Some persons who have made trial of both, recommend the latter for the convenience of giving air to the plants, for there is no other contrivance in the first sort for admitting the air, but by raising the whole frame on one side in proportion to the quantity of air intended to be admitted; and when the season is warm they generally raise those frames on both sides, and permit the plants to run out from under them.

When these frames are made, if they are well painted over with the following composition, it will greatly preserve them, viz. to every six pounds of melted pitch, add half a pint of Lintseed-oil, and a pound of brick-dust; these should be well mixed together, and used warm; when this dries it becomes a hard cement, so that no moisture can penetrate through it, and is the best sort of pigment for all timber exposed to the weather, I have ever seen used; so that where the colour is not offensive to the sight, it should be preferred to every other.

When the frames are thoroughly dry, the paper should be pasted on to the frames. The best sort of paper for this purpose is what they call Dutch wrapper; this is strong, and when oiled over becomes pellucid, so admits the rays of light through it extremely well. After the paste is well dried, the paper should be oiled over on the outside, which if well done with Lintseed-oil will be sufficient, for the oil will soak quite through the paper, so there will be no necessity for oiling both sides, nor for doing it over more than once. The oil should be dry before the frames are exposed to the wet, otherwise the paper will tear. In the pasting of the paper on the frames, there should be care taken to stretch it very smooth, and also to paste it to all the ribs of the frames, and also to the pack-

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packthreads, to prevent the wind from raising the paper, which would soon tear it when it became loose.

The above description, together with the annexed plan, it is hoped will be sufficient instructions for any one who is desirous of making these covers; and what has been before mentioned under the article MELON, will be directions enough for the use of them; so that I shall only add one caution which may be necessary to repeat here, which is, not to keep these covers too close down over the plants, lest it draw them too weak, so that air should always be admitted to the plants at all times in proportion to the warmth of the season.

These covers of oiled paper are not only useful for covering of Melons, but are the best things to cover cuttings of exotic plants, when planted, that can be contrived, and are also capable of being used for many other purposes.

The paper will seldom last longer than one season, so it will require a new covering every spring; but if the frames are well made, and when they are out of use, laid up in shelter from the wet, they will last several years, especially if there is a band of straw laid round the Melons, upon which the frames may stand; so they will not rest upon the ground, and the straw-bands will prevent the damp from rising so as to rot them. These straw-bands are such as are recommended for the hot-beds of Asparagus in winter.

STRAMONIUM. See **DATURA**.

STRATIOTES. Lin. Gen. Plant. 607. Aloides. Boerh. Ind. alt. Plant. 2. p. 172. Water Soldier.

The **CHARACTERS** are,

It has one flower inclosed in a compressed obtuse sheath, composed of two leaves which are keel-shaped and permanent. The empalement of the flower is of one leaf, trifid and erect. It has three almost heart-shaped petals, which are twice the size of the empalement, erect and spreading, and about twenty stamina inserted in the receptacle of the flower, terminated by single summits. The germen is situated under the empalement, supporting six styles divided in two parts, crowned by single stigmas. The germen afterward becomes an oval capsule, narrowed on every side, having six angles, and as many cells filled with oblong incurved seeds.

This genus of plants is ranged in the sixth section of Linnæus's thirteenth class, which includes those plants whose flowers have many stamina and six styles.

We know but one **SPECIES** of this genus, viz.

STRATIOTES (*Aloides*.) Lin. Flor. Lap. 222. *Water Soldier, Water Aloe, or Fresh Water Soldier.* Aloe palustris. C. B. P. 280. *Marsh Aloe.*

This plant is in shape like the Aloe, but the leaves are thinner, and serrated on the edges very sharply; they are of a grayish colour, and about a foot long; between the leaves, from the center of the plant, arise one, two, and sometimes three stalks, almost the length of the leaves, each being terminated by a three-forked sheath, out of which bursts one white flower composed of three roundish heart-shaped petals, with many yellow stamina in the middle. Below the flower is situated a conical germen which is reversed, the broad end standing upward and the narrow downward. This becomes a six-angled capsule, having six cells filled with seeds. It flowers in July, and the seeds ripen in September. It grows plentifully in standing waters in the Isle of Ely, and many places in the North of England, from whence young plants may be procured in spring, when they first rise on the surface of the water; and these being placed in large ponds or canals, will strike down their roots, and propagate without any farther care. In autumn the plants sink down to the bottom of the water, and rise again in the spring.

STRAWBERRY. See **FRAGARIA**.

STRAWBERRY-TREE. See **ARBUTUS**.

STYLE. The Style of a flower is a body accompanying the germen, either arising from the top of it, or standing as an axis in the middle of the germen, and supports the stigma, which is supposed the fe-

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male organ by which the farina is received and conveyed to the germen.

STYRAX. Tourn. Inst. R. H. 598. tab. 369. Lin. Gen. Plant. 527. Storax-tree.

The **CHARACTERS** are,

The flower has a short cylindrical empalement of one leaf, indented in five parts; it has one funnel-shaped petal, with a short cylindrical tube the length of the empalement, whose brim is cut into five large obtuse segments which spread open; it has ten or twelve awl-shaped stamina disposed circularly, which are inserted in the petals, and terminated by oblong summits, and a roundish germen, supporting a single style the length of the stamina, crowned by a ragged stigma. The germen afterward turns to a roundish fruit with one cell including two nuts, which are plain on one side and convex on the other.

This genus of plants is ranged in the first section of Linnæus's eleventh class, which contains the plants whose flowers have twelve stamina and one style.

We know but one **SPECIES** of this genus, viz.

STYRAX (*Officinale*.) Hort. Cliff. 187. *The Storax-tree.* Styra folio mali cotonei. C. B. P. 452. *The Quince-leaved Storax-tree.*

This plant grows plentifully in the neighbourhood of Rome, and also in Palestine, and several of the islands in the Archipelago, from whence the fruit has been brought to England, where there have been many plants raised of late years in some curious gardens.

It has a woody stalk which rises twelve or fourteen feet high, covered with a smooth grayish bark, and sends out many slender ligneous branches on every side, which are garnished with oval leaves about two inches long, and one inch and a half broad, of a bright green on their upper side, but hoary on their under; they are entire, and are placed alternately on short foot-stalks. The flowers come out from the side of the branches, upon foot-stalks which sustain five or six flowers in a bunch; these have one very white petal which is funnel-shaped, the lower part being tubulous and cylindrical; the upper part is divided into five obtuse segments which spread open, but not flat, rather inclining to an angle. These appear in June, and are sometimes succeeded by berries in England, which ripen in autumn.

It may be propagated by sowing the seeds in pots filled with fresh light earth, and plunged into a moderate hot-bed. This should be done as soon as possible when the seeds are procured, for if they are sown the latter end of summer, and the pots kept in a moderate hot-bed of tanners bark all the winter, the plants will come up the succeeding spring; whereas those sown in the spring, often remain in the ground a whole year before the plants come up.

When the plants are come up, they should be hardened gradually to the open air, into which they should be removed in June, placing them in a sheltered situation, observing to keep them clean from weeds, as also to supply them with water duly in dry weather. In this place they may remain till autumn, when they should be placed under a common hot-bed frame, where they may be screened from hard frost in winter, but in mild weather enjoy the free air as much as possible, for if they are kept too close their tops are very subject to grow mouldy. The leaves of these plants fall off in autumn, and in the spring, before they begin to shoot, they should be shaken out of the pots, and their roots carefully parted, and each transplanted into a separate small pot filled with light fresh earth, and plunged into a very moderate hot-bed, observing to water and shade them until they have taken root; after which they should be inured to the open by degrees, into which they must be removed in June, placing them in a warm situation; in which place they may remain till the end of October, at which time they should be removed into shelter for the winter season. These plants are tolerably hardy, and only require to be sheltered from severe frost while they are young; for in Italy they grow extremely

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extremely well in the open air, and produce fruit in great plenty. When the plants have grown three or four years in pots, and are become strong, some of them may be turned out of the pots, and planted in the full ground, against a wall to the south aspect, to which their branches should be trained in the same manner as is practised with fruit-trees, in which situation they will bear the cold of our ordinary winters very well; but in very severe frost, it will be proper to cover the branches either with mats, Straw, or other light covering to protect them.

The gum of this tree is used in medicine, which is obtained by making incisions in the tree. It is brought from Turkey, but is so adulterated by mixing sawdust or other stuff with it, that it is very difficult to meet with any that is pure. It has a most pleasant fragrant odour; it is called *Styrax calamita*, because it was transported in hollow canes.

There is another sort of Storax, which is called *Styrax liquida*, which is a thick tenacious substance like turpentine, of a reddish brown colour. It has been much disputed among the writers on the *Materia Medica*, what this is, some believing it to be the gum or resin of a tree, and others thought it to be a fictitious thing; but Mr. Petiver says, in the *Philosophical Transactions*, N° 313, it is a kind of bird-lime made of the bark of a tree, by boiling it in salt water. The tree grows on the island of Cebros, at the upper end of the Red Sea, near Cadesch, which is within three days journey of Sues. It is called *Rosa mallas*, and by the Turks *Cotta mija*.

Of late years there has been another species of Storax imported from North America, which is collected from the liquid Amber-tree; this has been titled liquid Storax by some, but is very different from that which is brought from Turkey, and is clear, inclining to yellow; it is brought sometimes liquid, and at others it is dried in the sun to a concrete resin before it is transported.

SUBER. See *QUERCUS*.

SUBTERRANEOUS is that which is under or within the surface, bowels, or caverns of the earth, or the hollow places of the earth, that are under ground.

SUCCORY. See *CICHORIUM*.

SUCCULENT PLANTS are such whose leaves are thick, and abound with juice.

SULPHUREOUS is of a brimstone colour.

SUMACH. See *RHUS*.

SUMMITS, or apices, are those bodies which contain the prolific powder, analagous to the male sperm in animals; these generally hang upon the stamina or threads, which surround the ovary in flowers.

The **SUN** has usually been reckoned among the number of planets, but he ought rather to be numbered among the fixed stars.

According to the Copernican hypothesis, which is now generally received, and which has even demonstration on its side, the sun is the center of the planetary and cometary system, round which all the planets and comets, and our earth among the rest, revolve in different periods, according to their different distances from the Sun.

But the Sun, though thus eased of that prodigious motion whereby the antients imagined him to revolve daily round our earth, yet he is not a perfectly quiescent body.

From the phenomena of his maculae or spots, it evidently appears, that he has a rotation round his axis, like that of the earth, whereby the natural day is measured, only slower.

Some of these spots have made their first appearance near the edge or margin of the Sun, and have been seen some time after on the opposite edge; whence, after a stay of about fourteen days, they have re-appeared in their first place, and taken the same course over again, finishing their entire circuit in twenty-seven days time, which is hence deduced to be the period of the Sun's rotation round his axis.

This motion of the spots is from west to east, whence

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it is concluded, that of the Sun; to which the other is owing, is from east to west.

Dr. Hook thinks it reasonable to conclude, That the superficies of the Sun is covered with air, or atmosphere, or some other fluid body, and that its atmosphere, though possibly eighty times thicker than that about our earth; yet, in comparison of the vast diameter of the Sun's body, becomes wholly invisible to us, though assisted by the best telescopes.

He supposes it also to look as bright as the body of the Sun itself, and that it is really the shell of this atmosphere, and not the very body of the Sun that shines; and from hence he says, That all the phenomena of the maculae and faculae of the Sun will be solved; and that they are only clouds or smokes in this atmosphere.

He concludes, That the Sun itself within this atmosphere is a solid and opacous body, from these reasons:

1. The constancy of its rotation.
2. The fixedness of its axis.
3. The power of its gravitation or attraction towards its center.

He concludes, That these prove its solidity and opacity from the disappearing of the solar spots in the limb, and their not returning backwards, as they would seem to do, if the body were transparent, as the atmosphere is, or the flame of a candle, or the radiation of hazy light about the nucleus of a comet, through which, as well as through its beard, the small fixed stars may be seen.

He thinks the superficial parts of the Sun to consist of bodies similar to our nitre and sulphur, and that these are set on fire, and consequently, that the physical cause of its light is the actual burning or fire of its superficial salts.

Nor can there be any objection of moment brought against this hypothesis, from the danger of the Sun's fire being burnt quite out in so many thousand years it hath been in being, for (says he) supposing it to have grown some minutes less, since it began to give light, none can contradict it by any observations we have upon record.

For, supposing we had astronomical observations of 4000 years standing, as we have none of above 2000 of that kind, and allowing that the Sun's diameter had then been observed to be as many minutes as it is now, yet it could not thence be concluded, that the Sun did not lose a mile in diameter every year, and consequently be now 4000 miles less in diameter than it then was.

For since his diameter is near 87 times greater than that of the earth, which latter he supposes 8000 miles, then the Sun's must be 696,000 miles. Now 4000 is but the 174th part of the diameter, and consequently would have diminished it but one eighth of a minute, which is a much less quantity than the antients pretended to observe to.

But supposing they could have observed even to seconds, yet that could not have contradicted it, because it is possible the Sun may have approached as much nearer us as that diminution amounts to, and for which, he saith, he could shew a reason.

Sir Isaac Newton also, in his optics, gives good reason to suppose the Sun and fixed stars to be great earths, vehemently hot, whose heat is conserved by the greatness of their bodies, and the mutual action and re-action between them and the light which they emit; and whose parts are kept from fuming away, not only by their fixity, but also by the vast weight and density of the atmospheres incumbent on them, and every way strongly compressing them, and condensing the vapours and exhalations which arise from them.

The light seems to be emitted from the Sun and fixed stars (which probably are Suns to other systems,) much after the manner as iron, when heated to such a degree, as to be just going into fusion by the vibrating motion of its parts, emits with force and violence copious streams of liquid fire all around. Great bodies must preserve their heat longest, and that, perhaps, in the proportion of their diameters.

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Sir Isaac Newton hath made it probable, that the great comet in the year 1680, in its perihelion, went so near the Sun, as that it acquired a heat, which would not entirely go off in 50,000 years; whence we may guess, that if the Sun and fixed stars be only collections of dense and solid matter, like the planets, but heated to a very intense degree, they may be many millions of years without losing any considerable part of their heat.

According to Cassini, the Sun's distance from the earth is 172,800,000 English miles.

As for the annual motion of the Sun round the earth, it is easily shewn by astronomers, that the annual motion of the earth will occasion such an appearance. A spectator in the Sun would see the earth move from west to east, for the same reason that we see the Sun move from east to west, and all the phænomena resulting from this annual motion, in which soever of the bodies it be, will appear the same from either.

As to the nature, properties, and figure of the Sun, &c.

1. As the solar spots are found sometimes to stay three days longer behind the Sun than they spend in passing over the hemisphere visible to us, we easily deduce that they do not adhere to the surface of the Sun, but are at some distance therefrom.

2. As the spots frequently rise and vanish even in the midst of the Sun's disk, and undergo several changes, both with regard to bulk, figure, and density, it follows, that they frequently rise, de novo, about the Sun, and are again dissipated.

3. Hence it should follow, that they are formed out of the exhalations of the Sun, and are no other than solar clouds.

4. Since then exhalations proceeding from the Sun rise above him, and stop at a certain altitude, it is evident there is some fluid encompassing the Sun to urge the exhalations to rise, and this fluid must be denser at bottom, and rarer at top, like our atmosphere.

5. Since the spots frequently dissolve and disappear in the middle of the Sun's disk, the matter of the spots, that is, the solar exhalations, fall back again to the Sun; whence it follows, that there must arise various alterations in the Sun's atmosphere, and the Sun himself.

6. Since the revolution of the spots round the Sun is found very regular, and likewise very near the Sun, it follows, that they do not revolve round the Sun, but that the Sun, together with his atmosphere, wherein the maculæ are, move round their common axis in an interval of about twenty-seven days; and hence it is, that the spots near the limb, being viewed obliquely, appear narrow and long.

7. Since the Sun, in every situation, appears like a circular disk, its figure, as to sense, must be spherical, though it is really spheroidical.

8. That the substance of the Sun is fire, is thus proved: the Sun shines, and his rays, collected by concave mirrors, or convex lenses, burn, consume, and melt the most solid bodies, or else convert them into ashes or glass.

Wherefore, as the solar rays are diminished by their divergency in a duplicate ratio of the distances reciprocally taken, it is evident that their force and effect is the same when collected by a burning lens or mirror, as if we were at such a distance from the Sun where they were equally dense. The Sun's rays therefore, in the neighbourhood of the Sun, produce the same effects as might be expected from the most vehement fire; consequently, the Sun is of a fiery substance.

Hence it follows, that its surface is every where fluid, that being the condition of flame.

Indeed it is not absolutely determined, whether the whole body of the Sun be fluid, as some think, or solid, as others; but as there are no other marks, whereby to distinguish fire from other bodies, but light, heat, a power of burning, consuming, melting, calcining, and vitrifying, we do not see what should hin-

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der, but that the Sun may be a globe of fire like ours, invested with flame.

9. Since the maculæ are formed out of the solar exhalations, it appears, that the Sun is not pure fire, but that there are heterogeneous particles mixed along with it.

Some make the mean distance of the Sun from the earth 7490 diameters of the earth, others 10,000, others 12,000.

The Sun, according to that excellent chemist, the younger Lemery, seems to be no other than a huge mass, or collection of the matter of fire or light, though so placed as to disable it to act on bodies here on earth, otherwise than by one of these two ways: first, by emanations or emissions of his own substance transmitted hither; but this hypothesis being subject to great difficulties, and not sufficiently answering to certain phænomena, recourse is had to another, which supposes trains of fire or light, disposed in all the interstices of the grand expanse of air and æther between the Sun and us; and that these trains are made to act on terrestrial bodies, by their being vigorously driven or impelled toward such bodies, by the immediate action of the Sun thereon.

These trains, in effect, may be esteemed as a sort of little Suns prolonged, but always depending on the great Sun, as the source of their motion and action on bodies; it is those that form the rays of light; they do not, in point of matter, differ from the substance of the Sun himself, but only in this, that the same thing is more copious in one case than the other. In the Sun we may suppose the matter of light more abundant than in the focus of our largest burning-glasses. Thus from the vehement action of the rays of the Sun collected in such glass, we learn what use the air, interposed between the rays of light, is of in tempering their action, and rendering it more supportable, since, without such medium, instead of warming and illuminating, it would blind and burn us. So that the air may be considered as having somewhat of the same effect, with respect to the rays of light upon us, that the water in a balnæum mariæ has. Mem. de l'Acad. ann. 1713.

Omitting to enter into a particular discussion about the matter of the Sun, and whether it be fire, to us it appears very extraordinary, that the Sun, after a continual emission of the corpuscles of fire upwards of 5000 years, should not be yet exhausted.

Whilst the Sun is above the horizon, he impels all the rays, before vague and fluctuating, toward a focus, and such impulsion or determination is always in right lines; so that all our light, heat, and colour, is the effect of a rectilinear motion.

Suppose, for instance, a fire in a dark place, and a thermometer placed at a certain distance therefrom, with an iron plate between them; in this case, the thermometer will not be affected by fire, by reason that the rectilinear passage of the heat is stopped. Nor need it be added, that under the like circumstances no light, colour, &c. are perceivable, so that none of these act but in right lines.

If there were no Sun, nor any body to supply its place, there would be no heat, i. e. the fire would not be determined in right lines, so that the Sun is the father of all heat, or some other body that acts in the same manner as the Sun, for the Sun does not make heat, but only the difference between the heat of the day and the night.

Dr. Halley observes, That the Sun, radiating on the earth in the morning, has but little effect, but that, when raised to the meridian, he acts with all his force. Now this is owing to the atmosphere, which, being replete with an infinite number of corpuscles, reflects more of the Sun's rays to the earth, when they fall perpendicularly, than would otherwise arrive there; for whereas falling obliquely, they would be reflected, and thus be thrown off, and dispersed into other parts, now that their incidence is perpendicular, they will pass directly through.

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And hence arises what is frequently observed by sailors, viz. That when the Sun radiates obliquely upon the sea, as in the evening, there is no enduring his rays, by reason they are all reflected from the water, and scarce any lost therein; so that the rectitude or obliquity of the rays contributes very considerably to the collecting of fire.

And this obliquity, &c. is to be considered in a two-fold respect, both with respect to the matter in the atmosphere, and to the surface of the earth.

Now heat may be varied two ways:

1. By means of the atmosphere, for this does not always remain the same. Thus, e. g. Water is naturally transparent, and if you warm it, it still retains its transparency; but if you make it boil, the vapour issuing from it, though perhaps a million of times rarer than the primitive water, will not be transparent, but opaque, by reason its parts now are under a different arrangement.

And hence those legions of corpuscles every where floating in the vast receptacle of the atmosphere, whenever they acquire a different disposition, which they frequently do, alter the collection of the rays on the earth. Add, that those white clouds, which appear in summer time, are as it were so many mirrors, and occasion excessive heat.

These cloudy mirrors are sometimes round, sometimes concave, polygonous, &c. When the face of the heaven is covered with such white clouds, the Sun shining among them must of necessity create a great heat, since many of his rays, which would otherwise perhaps never touch our earth, are hereby reflected to us. Thus, if the Sun be on one side, and the clouds on the opposite one, they will be perfect burning-glasses. And hence the phenomena of thunder, &c.

I have, says Dr. Boerhaave, observed, a kind of hollow clouds full of hail and snow, during the continuance of which the heat was extreme, since, by such condensation, they were enabled to reflect much more strongly; after this came a sharp cold, and then the clouds discharged their hail in great quantity, to which succeeded a moderate warmth. Frozen, concave clouds therefore, by their great reflexions, produce a vigorous heat, and the same, when resolved, excessive cold.

Hence it is probable, that thunder is only produced when such concave clouds, before convolved into spherical figures, are driven with opposite motions against each other, and the rays transmitted through those spheres from burning foci.

All clouds, it is probable, contain snow and ice, but these in their fall through the warmer regions of the atmosphere near the earth, liquefy and distil in drops. The meteors in the atmosphere have likewise their share in reflecting of fire. These, in effect, are a sort of wandering fire visible by night, and which determine the fire over and upon the earth.

2. It is varied by means of the earth; for, as the surface of the earth varies, so must the heat. Thus sandy places, reflecting more rays than others, must excite a greater degree of heat.

On the highest mountains we always find the most cold, snow, and hail.

In the sultry regions of Peru the mountains are all summer long covered with snow, by reason they only receive direct, and but little refracted fire; and the effect of fire, arising merely from being determined by the Sun into a parallelism, is found by computation to be very inconsiderable. For this effect, as already observed, is greater in winter than in summer.

Though the Sun be in his apogee in the summer, and in his perigee in winter, yet will a night's ice bear it shining upon it five or six hours ere it be thawed.

And if, as the Sun rises nearer toward the zenith, the ice and snow at length begin to run, this is not owing to the greater force of the Sun, but to the greater reflexion and collection of his rays from the circumstances and position of the atmosphere and earth.

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But the highest tops of hills are always free from snow; the reason whereof is, that water, i. e. the vapours and exhalations, emitted therefrom, never rise by the Sun's action above a mile high. But there are mountains a mile and a half high; to the tops of these therefore, vapours, and consequently clouds, can never mount.

And hence it is, that in very high mountains, as the Pico de Theide in Bohemia, though the middle part be eternally invested with ice and snow; and the bottom scorched with intolerable heat, yet on the top you find yourself in a pure, thin, serene air, and view the clouds hovering at a considerable distance below you. Hence also it is, that all thunder is confined within less than a mile's height.

Add, that in caverns, and the hollow parts underground, the heat is found very great, so that the air is coldest in the highest places, and hottest in the lowest, but in the intermediate atmosphere very unequal. Heat therefore depends on clouds, mountains, &c. which reflect the light variously, and on the direction of the Sun's rays, or the position of his body with respect to us.

Hence again we gather that fire is the universal cause of all the motions about our earth, for all fluidity depends on fire, and accordingly, in the large burning-glasses, the firmest bodies become fluid, and evaporate in fume; and the more fluid any body is, the more it contains, whence it is, that water, deprived of all its fire, fixes into ice, and when exposed afresh to the fire resolves into water; and all fluids whatever, if destitute of fire, would do the same.

The Sun may be accounted the *parens naturæ*, or the *primum mobile* of all vegetative motion.

The Sun's attractive virtue is very conspicuous in the exhalation of those crude and unwholesome vapours, with which the earth is often infested, which, if they were suffered to continue long upon the face of the earth, would render it a miserable desert.

The Sun, by sublimating those crude and hurtful vapours, and their being rarefied before their descension and distribution, forms them into rain, which is of great consequence in vegetation.

To this may be added the attraction of plants themselves, which creates a kind of emulation in them, which shall grow the tallest.

But that which the ancients used to attribute to attraction, may now be very well solved by pulsion. To apply which to the matter in hand: when the surface of the sea, &c. is divided by the heat of the Sun, and the power of the air, their ascension thro' the atmosphere, either by the rarefaction of the air by the Sun, or otherwise by the respiration of the terraqueous globe, which in this case may be supposed to act like the body natural; or else, that the air, being rarefied by the Sun beams, does, by the gravitation of his own body in general, force those humid vapours by pulsion upward, through those beams or rays of light, which are, as it were, so many pipes or tubes for their ready passage, ascension, and conveyance.

Or if those vapours are conveyed by the undulation of the air in a perpendicular manner, rather than a radiant one, through the rays and beams of light, which soever of these ways it is, the Sun is the principal agent in this business, and the whole process is either attraction, pulsion, or respiration, forwarded by the virtual power of it.

That the rarefaction of the air by heat is a great help to attraction or pulsion may be discovered by the fire engine made by Mr. Savary. We cannot say that the water is either forced or attracted by the heat, but that the air that is in the pipe is lengthened by its rarefying quality to such a degree, that the equilibrium is lost, and the impulse and pressure of the air which is without, forces the water to that great height that is seen in the operation.

And so, if a little scrip of paper burning and fuming be put into a common drinking glass, and it be turned

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ed up immediately, and put upon a plate of water, it seems as though it would suck it up into the glass; when indeed the truth of the experiment is, that it is only the outward pressure, and the inward weakness of the air to resist, being purified by heat; for if the same glass should be plunged into a basin of water up to the foot of it, yet the water that is in the basin would not enter into the glass, till the air, either having lost its own strength, or rather insinuated or incorporated itself in the water, loses its own strength; such is the force of air.

But this may suffice concerning what the ancients call attraction, which in many cases is solved by pulsion, or the pressure and elastic power of the air, rather than by the attractive power of the Sun.

It is sufficiently proved by ocular demonstration that the vapours of the sea, rivers, lakes, and all the humidities of the ground, are drawn up after this manner.

And that heat is an agent in this operation has been clearly proved by the experiments of that learned naturalist Dr. Halley, by taking a vessel of water four inches deep, and seven and nine tenths in diameter, which being warmed to such a degree, as might be supposed the air might do it, in some of the hottest months, and letting it stand about two hours time, and weighing it, found it had evaporated near half an ounce, although there did not appear any reek or smoke, nor did the water seem warm, by putting his finger into it; from which it may be concluded, that out of that small superficies of the water, six ounces would be evaporated in the space of twenty-four hours.

Upon this supposition every ten square inches of the surface of water yield in vapour, per day, a cube inch of water; and each square foot, half a wine pint; and every space of four feet square, a gallon; a mile square, 6914 tuns; a square degree, suppose of 69 English miles, will evaporate 33 millions of tuns.

This will account for the Caspian sea being always at a stand, and neither wasting nor overflowing; and also for the current said to set always in at the Straights of Gibraltar, notwithstanding that those Mediterranean seas receive so many, and so considerable rivers.

This experiment has been carried yet farther by the Oxford Society, who, supposing a cubical foot of water to weigh 76 pounds, and this foot containing 1728 cubic inches, and divided in the 76 pounds, gives half an ounce and $13\frac{1}{3}$ grains, which is the weight of a cubical inch of water; therefore the weight of the 233 grains $\frac{233}{\frac{1}{2}\frac{1}{3}\frac{1}{3}}$, or 35 parts of a cubic inch divided by thirty-eight.

Then the area of a circle, the diameter of which is 7 inches and upwards, is more than 49 square inches, which if it be divided by $\frac{35}{38}$ parts of an inch, the quantity of water carried off in vapours, the product will be $\frac{35}{1802}$ or $\frac{1}{53}$ parts of an inch, wasted in that experiment. This is a plain proof of what a great quantity of water may be thus carried off, in great dimensions of water, even enough to supply all rains, dews, &c.

But the Sun, besides this, has a diffusive power (not to dwell on the light it conveys to these sublunary regions) without which the whole race of mankind must wander and grovel in the dark, for by its genial and chearful rays it exhilarates the vegetable part of the creation, and makes natures herself to smile.

It has an influence upon deep grounds by warming and chearing the pores of the earth, when diluted and sodden by too much wet, and puts the emulgent fibres of plants upon seeking their food.

It helps the surface of the ground by attracting or dispelling the vapours, which would otherwise make it noxious; but more particularly it warms and heats the ground, and by its powerful influence contributes to dissolve the latent salt, and prepares them for being sucked in by the fibres of the plants, which, by the same genial force, are put in action to seek out for their food.

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The Sun also exhales all superfluous moisture, and by its vital heat, comforts the dilated pores.

The Sun diffuses the early dews, which, if they lay too long on plants, would rot rather than refresh them; it also presses them into the nerves, and other analogous parts. This influential power operates on the boughs, branches, leaves, and fruit.

The Sun also qualifies the air, which otherwise, by its frigidity, would stop the very course of nature, and indeed it would be difficult to instance any thing in the whole circle of botanology, that does not participate of a share of this virtual and diffusive good.

From what has been said we may easily account for the difference of heat in summer and winter, viz. from the obliquity of the Sun's rays. This therefore should be well considered in the contrivance of stoves, to preserve the most tender exotic plants, which ought to have their glasses so situated, as to receive the Sun's rays in direct lines as great a part of the year as possible; for which reason the stoves, which have upright glasses in front, and sloping glasses over them, are justly preferred to any at present contrived. And from hence we see the advantage of making the back part and ceiling of all green-houses and stoves as white as possible, since it is evident, that the rays of light are hereby reflected with much greater force, and so consequently the heat is greatly increased, which should always be observed in buildings of this kind.

From hence also we may learn, that countries in the same latitude may be very different in their heat, according to their situation, in respect to the Sun's rays, or according to the nature of the soil in reflecting the rays with a greater or less force; so that in preserving exotic plants, the heat which they require cannot be exactly determined from the latitude of the places of their growth; but the situation of the places must also be considered, as, whether they grow on hills, mountains, or valleys; and if on the side of hills, which side in respect to the Sun, with several other observations, which ought to be made by such as collect plants in foreign countries.

I shall here add a table of the shadow of the Sun at the several seasons of the year, which was communicated to me by Mr. Timothy Sheldrach of Norwich, by which a person may more readily see what effect walls, buildings, trees, &c. have, in shading the ground to several distances, according as the Sun is more or less elevated above the horizon; as also how great the shade will be in the green-houses, as the piers are in breadth, or the wall in front is in height below the sashes.

☉ in ♈			☉ in ♊			☉ in ♏			Lat. 51° 30'		
Degr. of Lat.			Degr. of Lat.			Degr. of Lat.			The length of the shadow of a column of five feet high at the time the sun enters every sign.		
°	'	"	°	'	"	°	'	"	☉ in 5 feet	Feet	Inch
30	—	8	10	—	10	0	—	17 30	♈	2	—
40	—	17 30	20	—	22 30	10	—	37 30	♊	3	1
50	—	32 30	30	—	35	20	—	57 30	♏	3	11½
60	—	47 30	40	—	47 30	30	—	1 17	♉	8	3
70	—	1 7 30	50	—	1 10	40	—	2 23 0	♊	6	6
80	—	1 40	60	—	1 50	50	—	3 40	♏	2	7
90	—	2 37 30	70	—	2 40	—	—	—	♉	15	5
			80	—	10	—	—	—	♊	20	—

The first three tables shew the length of shadows in the summer and winter solstice, and in the vernal and autumnal equinoxes. Suppose a mountain, column, or other body, whose perpendicular height is one degree. The length of the shadow from any thing of that altitude is here shewn in every degree of latitude; at the above-mentioned times, in degrees and minutes, and where a shorter measure than a mile is required, it is shewn in seconds. The fourth table is calculated for the latitude of 51° 30', which is pretty near that of London. This fourth table shews the length of the shadow made by any perpendicular

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lar body of five feet altitude on a plane, at which time the Sun enters every sign of the zodiac, which, at a south Sun, will be found very exact on a true level.

SUPERFICIES of the ground, &c. is the out-part or surface of it.

SURFACE is the bare outside of a body or superficies.

SURIANA. Plum. Nov. Gen. 37. tab. 40. Lin. Gen. Plant. 353.

The **CHARACTERS** are,

The empalement of the flower is permanent, and composed of five spear-shaped small leaves. The flower has five oval petals the length of the empalement, which spread open; it has ten slender stamina which are shorter than the petals, terminated by single summits, and five roundish germen supporting a slender style the length of the stamina, which is inserted in the middle to the side of the germen, crowned with an obtuse stigma. The germen afterward become five roundish seeds joined together.

This genus of plants is ranged in the fifth section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and five germen.

We know but one **SPECIES** of this genus, viz.

SURIANA (*Maritima*.) Hort. Cliff. 492. *Suriana*. *Suriana foliis protulacæ angustis*. Plum. Nov. Gen. 37. *Suriana with narrow Purslain leaves.*

This plant was so named by Father Plumier, who discovered it in the French settlements in America, in honour of Joseph Surian of Marseilles, who was a very curious botanist.

This grows naturally by the sea side in most of the islands in the West-Indies, where it rises with a thick shrubby stalk eight or nine feet high, covered with a dark brown bark, and divides into branches, the upper part of which are closely garnished with leaves on every side standing without order; they are about an inch long, and one eighth of an inch broad at the point, growing narrower to their base; they are rounded at their points, and sit close to the branches, having no foot-stalks; they are of a dirty green colour. From between the leaves come out the foot-stalks of the flowers, which are about an inch long; these do each sustain two, three, or four yellow flowers, which have some four, and others five petals, which are rounded at their points, and almost heart-shaped; these are succeeded by roundish seeds, which are joined together, sitting in the empalement. Some flowers have two, others three, four, or five seeds to each.

The seeds of this plant were brought from the Havana by the late Dr. William Houstoun, who found the plants growing there in great plenty on the shore, in moist places, where the salt water usually flows. It also grows plentifully in some parts of the island of Jamaica.

It is propagated by seeds, which must be sown on a hot-bed early in the spring, and when the plants are come up they must be carefully cleared from weeds, and frequently refreshed with water. In warm weather the glasses of the hot-bed should be raised every day to admit fresh air to the plants, to prevent their drawing up too weak. When the plants are fit to remove, they should be taken up carefully, and each planted in a separate small pot filled with fresh light earth, and plunged into a hot-bed of tanners bark, observing to shade them until they have taken new root; after which time they must be duly watered every evening in hot weather, and they must have fresh air admitted to them every day in proportion to the warmth of the season. In this hot-bed the plants may remain till autumn, when the nights begin to be cold, at which time they should be removed into the stove, and plunged into the bark-bed. During the winter season these plants must be kept very warm, especially while they are young, otherwise they will not live through the winter in this country. They must also be frequently refreshed with water, but it must not be given to them in large quantities in cold weather, for too much moisture in winter will soon destroy them. These plants make but slow progress

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the first year, afterwards they will grow pretty freely if they are not stinted. In winter they must constantly be kept in the stove in this country, and if they are plunged into the bark-bed, they will make the greater progress. In summer they must have a large share of air, by opening the glasses of the stoves; and if their leaves are covered with filth (which the plants in stoves often contract,) they should be carefully washed with a sponge, otherwise the plants will not only appear unsightly, but it will retard their growth.

SWERTIA. Lin. Gen. Pl. 321. *Gentiana*. C. B. P.

The **CHARACTERS** are,

The empalement is permanent, and cut into five spear-shaped segments; the flower is of one petal, divided at the top into five spear-shaped segments, and is larger than the empalement; it has ten nectarii which are small, erect, situated on the internal part of the petal at the division of the segments, and five awl-shaped stamina shorter than the corolla, terminated by incumbent summits; and an oblong oval germen having no style, but two simple stigmas. The empalement afterward becomes a taper acute-pointed capsule with one cell, filled with small seeds.

This genus of plants is ranged in the second section of Linnæus's fifth class, which contains those plants whose flowers have five stamina, and two styles or stigmas.

The **SPECIES** are,

1. **SWERTIA** (*Perennis*) corollis quinquefidis, foliis radicalibus ovalibus. Lin. Sp. Plant. 328. *Perennial Swertia with a five-pointed corolla, and the radical leaves oval.* *Gentiana palustris latifolia*. C. B. P. 188. *Broad-leaved Marsh Gentian.*
2. **SWERTIA** (*Difformis*) corollis quinquefidis, terminali sexfida, pedunculis longissimis, foliis linearibus. Lin. Sp. Plant. 328. *Swertia with a five-pointed corolla which terminates with six points, very long foot-stalks to the flower, and linear leaves.*

There are two or three other species of this genus, which grow naturally in Siberia and Canada, but as they are annual plants, and have not been introduced here, so I have not inserted them.

The first sort grows naturally upon the Alps in Helvetia and Bavaria. This is a perennial plant, sending out tufts of leaves from the root which are four inches long, and near two broad, of a deep green colour, and very smooth: from between these arise the foot-stalks of the flowers, which are eight or nine inches long, naked, and sustains a pretty large bunch of blue flowers on the top, whose petals are connected at the top. These appear in June, but are rarely succeeded by seeds in England.

The second sort grows naturally in Virginia. This hath narrow linear leaves which come from the root, about three inches long, and half a quarter of an inch broad; the foot-stalks of the flowers arise immediately from the root; they are about six or seven inches high, and support one blue flower.

These plants grow naturally in swamps, so are with difficulty preserved in gardens; and as they do not produce seeds, so are only propagated by parting of their roots; the best time for which is in September, that they may have time to be established before the frost comes on; they should be planted in the shade, and have a loose moist soil, and in summer must be frequently watered, otherwise they will not live, but the winters cold will never injure them.

SWIETENIA. See **CEDRUS**.

SYCAMORE. See **ACER MAJUS**.

SYMPHYTUM. Tourn. Init. R. H. 138. tab. 56. Lin. Gen. Plant. 170. [Some derive it from *συμφύειν* to conglutinate, because if the leaves or root of this plant are boiled with flesh, the flesh returns again into one mass; hence it is called the *Consolida major officinarum*.] Comfrey; in French, *Consoud*.

The **CHARACTERS** are,

The flower hath a five-cornered, erect, permanent empalement, cut into five acute segments; it has one petal with a short tube, about which the limb has a swelling belly, and thicker tube; the brim is indented in five obtuse parts

which are reflexed; the chaps are armed with five awl-shaped rays which are connected in a cone; it has five awl-shaped stamina which are alternate with the rays of the chaps, terminated by erect acute summits, and four germen supporting a slender style the length of the petal, crowned by a single stigma. The germen afterward turn to four gibbous acute-pointed seeds which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one style.

The SPECIES are,

1. SYMPHYTUM (*Officinale*) foliis ovato-lanceolatis decurrentibus. Hort. Cliff. 47. Comfrey with oval, spear-shaped, running leaves. Symphytum Consolida major, flore purpureo quæ mas. C. B. P. 259. Comfrey, or greater Consound, with a purple flower.
2. SYMPHYTUM (*Tuberosum*) foliis summis oppositis. Lin. Sp. Plant. 136. Comfrey with the upper leaves placed opposite. Symphytum majus tuberosa radice. C. B. P. 259. Greater Comfrey with a tuberous root.
3. SYMPHYTUM (*Orientale*) foliis ovatis subpetiolatis. Lin. Sp. Plant. 136. Comfrey with oval leaves and short foot-stalks. Symphytum Orientale, folio subrotundo aspero, flore cæruleo. Tourn. Cor. 7. Eastern Comfrey with a roundish leaf, and a blue flower.

There are a few other species of this genus, but those which are here enumerated, are all the sorts at present to be found in the English gardens.

The first sort grows naturally in England, but the most common here is that with a whitish yellow flower, which is found growing by the side of ditches and other moist places in great plenty, but that with purple flowers is the most common in Holland and Germany; these are supposed to be only accidental varieties, which differ in the colour of their flowers; however, this difference is permanent in the plants raised from seeds, as I have many times found; nor are the two kinds ever found mixed where they grow wild, for in those places where the blue is found, the white is never seen, and vice versa; but as there are no specific differences between them, I shall not separate them.

The common Comfrey has thick roots composed of many fleshy fibres or fangs, which run deep in the ground; they are black on the outside, but white within, full of a slimy tenacious juice. The lower leaves are large, long, sharp-pointed, hairy and rough. The stalks rise two feet high, which are garnished with oval spear-shaped leaves about five inches long, and two broad near their base, ending in acute points; they are hairy, rough, and from their base runs a leafy border along the stalk. From the upper part of the stalk are sent out some side branches, which are commonly garnished with two smaller leaves, and are terminated by loose bunches of flowers which are reflexed; each flower has one tubulous petal, whose upper part is bellied and thicker than the lower, and the chaps are closed by the stamina and rays which cross it, and shuts up the tube. These in the common English sort are of a yellowish white, and the foreign one is of a purple colour. It flowers in June, and the seeds ripen in August.

The second sort grows naturally in Germany; the roots of this are composed of many thick fleshy knobs or tubers, which are joined by fleshy fibres; the stalks incline on one side; they rise a foot and a half high; the leaves on the lower part are six inches long, and two and a half broad in the middle, ending in acute points, and are not so rough and hairy as those of the other species; they are placed alternate, and sit close to the stalks. The two upper leaves on every branch stand opposite, and just above them are loose spikes or bunches of pale yellow flowers, whose petals are stretched out farther beyond the empalement than those of the other. This flowers at the same time with the other.

The third sort grows naturally on the side of rivers near Constantinople; this hath a perennial root like the first; the stalks grow two feet high; the leaves are

rounder, and are armed with rough prickly hairs. The flowers are blue, and grow in bunches like those of the first sort; they appear in March, but are seldom succeeded by seeds in England.

These plants may be cultivated, either by sowing their seeds in the spring, or by parting of their roots: the latter way being the more expeditious, is chiefly practised where they are planted for use. The best season for parting the roots is in autumn, at which time almost every piece of a root will grow. They should be planted about two feet and a half asunder, that they may have room to spread, and will require no farther care but to keep them clear from weeds; for they are extremely hardy, and will grow upon almost any soil, or in any situation.

SYRINGA. Lin. Gen. Plant. 22. Lilac. Tourn. Inf. R. H. 601. tab. 372. Lilac.

The CHARACTERS are,

The flower has a small, tubulous, permanent empalement of one leaf, which is indented in four parts at the brim; it has one petal, with a long cylindrical tube cut into four obtuse segments at the brim which spread open, and two very short stamina terminated by small summits, standing within the tube; it has an oblong germen supporting a short slender style, crowned by a thick bifid stigma. The germen afterward turns to an oblong, compressed, acute-pointed capsule with two cells, opening with two valves contrary to the partition, including in each cell one oblong acute-pointed seed with a membranaceous border.

This genus of plants is ranged in the first section of Linnæus's second class, which contains those plants whose flowers have two stamina and one style.

The SPECIES are,

1. SYRINGA (*Vulgaris*) foliis ovato-cordatis. Hort. Cliff. 6. Syringa with oval heart-shaped leaves. Syringa cærulea. C. B. P. 391. Blue Syringa, and the Lilac. Matth. 1237. The blue Lilac.
2. SYRINGA (*Persica*) foliis lanceolatis. Lin. Sp. Plant. 9. Syringa with spear-shaped leaves. Lilac folio ligustri. Tourn. Inf. 602. Lilac with a Privet leaf, commonly called Persian Jasmine.
3. SYRINGA (*Laciniata*) foliis lanceolatis integris dissectisque laciniata. Hort. Cliff. 6. Syringa with entire spear-shaped leaves, and others which are cut and jagged. Lilac laciniato folio. Tourn. Inf. 602. Lilac with a cut leaf, commonly called cut-leaved Persian Jasmine.

The first sort is very common in the English gardens, where it has been long cultivated as a flowering shrub. It is supposed to grow naturally in some parts of Persia, but is so hardy as to resist the greatest cold of this country. There are three varieties of this shrub, which are commonly cultivated in the English gardens, and do not only differ in the colour of their flowers, but also in that of their shoots and leaves; one of these has white flowers, one blue, and the third has purple flowers; the latter is commonly known by the title of Scotch Lilac, to distinguish it from the other. This is the most beautiful of the three, and is probably called the Scotch Lilac, because it was first mentioned in the catalogue of the Edinburgh Garden. Whether this was raised from seeds, or which other way it was obtained I could never learn; but I take it to be a distinct species from the others, though there is not marks enough upon them to distinguish their specific differences; because I have raised many of the plants from seeds, which have always retained their difference, as have also the white, when they were propagated by seeds; so that they may be rather esteemed as distinct sorts, although by the rules now admitted for determining specific differences, they may not have sufficient marks whereby to distinguish them; and as they have been by many of the modern botanists joined together, I shall not separate them again, but shall mention the particulars in which they differ.

This shrub grows to the height of eighteen or twenty feet in good ground, and divides into many branches; those of the white sort grow more erect than the other, and the purple or Scotch Lilac has its branches yet more

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more diffused. The branches of the white are covered with a smooth bark of a gray colour, those of the other two are darker. The leaves of the white are of a bright green; their shape and size are so near as not to be distinguished thereby. They are heart-shaped, almost five inches long, and three and a half broad near their base; their foot-stalks are an inch and a half long, and are placed opposite. The buds of the future shoots, which are very turgid before the leaves fall, are of a very bright green in the white sort, but those of the other two are of a dark green. The flowers are always produced at the ends of the shoots of the former year, and below the flowers come out shoots to succeed them; for that part upon which the flowers stand, decays down to the shoots below every winter. There are generally two bunches or panicles of flowers joined at the end of each shoot; those of the blue are the smallest, and the flowers are smaller, their brims expanded, and are placed thinner than either of the other. The bunches on the white are larger; the flowers are closer placed, and larger than the blue; but those of the Scotch are larger, and the flowers are fairer than those of either of the other, so make a much finer appearance. The panicles of flowers grow erect, and being intermixed with the fine green leaves, have a fine effect: and if we add to this the fragrancy of their flowers, it may be ranged among the most beautiful shrubs which now decorate the English gardens. They flower in May, and when the season is cool, these shrubs will continue three weeks in beauty, but in hot seasons the flowers soon fade. Their seeds are ripe in September, which if sown soon after, the plants will come up the following spring; but as their roots send out great plenty of suckers annually, so few persons ever take the trouble to propagate these plants by seeds. I have raised several plants of the three sorts from seeds, and constantly found them prove the same as the shrubs from which the seeds were taken. These plants do generally flower the third year from seed, and I have always found these plants not so apt to send out suckers, as those which were produced by suckers, so are much more valuable; for the others put out such plenty of suckers, as that if they are not annually taken from the plants they will starve them, so that in this way the plants may be propagated in great plenty.

These plants thrive best upon a light rich soil, such as the gardens near London are for the most part composed of; and there they grow to a much larger size, where they are permitted to stand unremoved, than in any other part of England, for in strong loam, or upon chalky land, they make no progress. If the suckers are small when they are taken from the old plants, they should be planted in a nursery, in rows three feet asunder, and one foot distance in the rows, where they may stand a year or two to get strength, and then

they should be removed to the places where they are to remain. The best time to transplant these shrubs is in autumn.

There is a variety or two of these shrubs with blotched leaves, which some persons are fond of; but as these variegations are the effect of weakness, so whenever the shrubs become healthy their verdure returns again.

The second sort grows naturally in Persia; but has been long cultivated in the English gardens, where it is best known among the gardeners by the title of Persian Jasmine. This is a shrub of much lower growth than the former, seldom rising more than five or six feet high. The stalks of this shrub are woody, covered with a smooth brown bark; the branches are slender, pliable, and extend wide on every side; these frequently bend downward where they are not supported; they are garnished with narrow spear-shaped leaves placed opposite, which are about two inches and a half long, and three fourths of an inch broad, of a deep green colour, ending in acute points. The flowers are produced in large panicles at the end of the former year's shoots, in like manner as the former; they are of a pale purple colour, and have a very agreeable odour. These appear the latter end of May, soon after those of the common sort, and continue longer in beauty, but these do not perfect their seeds in England.

There is a variety of this with almost white flowers, which has of late years been obtained, but whether it came from seeds, or was accidentally produced from suckers from the purple kind, I cannot say.

The third sort differs from the second in having two sorts of leaves, those on the lower part of the branches are for the most part entire; these are broader and shorter than those of the second, and do not end in such sharp points. The leaves on the younger branches are cut into three or five segments like winged leaves, almost to the midrib. The branches of this sort are slenderer and weaker than those of the second; their bark is of a darker brown, and the flowers of a brighter purple colour.

This was brought into Europe before the other, and came by the Persian title Agem. Both these sorts are usually propagated by suckers, which their roots send out in great plenty; these should be carefully taken off from the old plant in the autumn, and planted in a nursery in the same manner as is before directed for the first, where they may grow two years to get strength, and may then be transplanted to the places where they are designed to remain. The plants which are so propagated, are always very prolific in suckers, for which reason it will be a better way to raise them by laying down their young branches, which in one year will be sufficiently rooted to transplant, and may then be treated in the same way as the suckers.

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TABERNÆMONTANA. Plum. Gen. Nov. 18. tab. 30. Lin. Gen. Plant. 265.

The CHARACTERS are,

The flower has a small empalement cut into five acute parts; it hath one funnel-shaped petal, with a long cylindrical tube, which is bellied at both ends, and the brim is cut into five oblique segments; it has five small

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stamina in the middle of the tube, terminated by summits which join together, and one germen supporting an awl-shaped style, crowned by decayed stigmas. The germen afterward turn to two bellied capsules which are horizontally reflexed, opening with one valve, having one cell, filled with oblong oval seeds lying imbricatum, and surrounded with pulp.

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This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. TABERNÆMONTANA (*Citrifolia*) foliis glomerato-umbellatis oppositis ovatis lateralibus. Lin. Sp. Plant. 308. *Tabernæmontana with oval leaves which are placed opposite, and flowers growing in glomerated umbels on the side of the branches.* Tabernæmontana lactescens, citri foliis undulatis. Plum. Nov. Gen. 18. *Milky Tabernæmontana, with waved Citron leaves.*
2. TABERNÆMONTANA (*Alba*) foliis oblongo-ovatis acuminatis oppositis, floribus corymbosis terminalibus. *Tabernæmontana with oblong, oval, acute-pointed leaves, which are placed opposite, and flowers growing in a corymbus terminating the branches.* Tabernæmontana lactescens, lauri folio, flore albo, filiquis rotundioribus. Houst. MSS. *Milky Tabernæmontana with a Bay leaf, a white flower, and rounder pods.*
3. TABERNÆMONTANA (*Laurifolia*) foliis oppositis ovalibus obtusiusculis. Lin. Sp. Plant. 308. *Tabernæmontana with oval obtuse leaves placed opposite.* Nerium arboreum, folio latiore obtuso, flore luteo minore. Sloan. Cat. Jam. 154. *Tree Oleander with obtuse leaves, and small yellow flowers.*
4. TABERNÆMONTANA (*Amsonia*) foliis alternis, caulibus subherbaceis. Lin. Sp. Plant. 308. *Tabernæmontana with herbaceous stalks, and alternate leaves.* Anonymus suffrutex. Gron. Virg. 26.

Father Plumier, who constituted this genus, gave it this title in honour of Dr. James Theodore, who was called Tabernæmontanus, from a little village in Germany, where he was born. He was one of the most knowing botanists of his age, and published at Francfort a folio, in a long form, in the year 1590, in which are the figures of two thousand two hundred and fifty plants.

The first sort grows naturally in Jamaica, and some of the other islands in the West-Indies. This rises with an upright woody stalk to the height of fifteen or sixteen feet, covered with a smooth gray bark, which abounds with a milky juice, and sends out several branches from the side, which grow erect, and have many joints; these are garnished with thick leaves which have a milky juice; they are from five to six inches long, and two broad in the middle, drawing to a point at each end; they are of a lucid green, and have many transverse veins from the midrib to the border, standing opposite on foot-stalks an inch long. The flowers come out in roundish bunches from the wings of the stalk; they are small, of a bright yellow colour, and have an agreeable odour. The tube of the flower is half an inch long; the brim is cut into five acute points, which spread open like those of the common Jasmine. These flowers in their native soil, are succeeded by two swelling capsules joined at their base, but spread from each other horizontally, and are filled with oblong seeds, lying over each other like the scales of fish, included in a soft pulp.

The second sort was discovered by the late Dr. William Houstoun in the year 1730, growing naturally at La Vera Cruz. This rises with a woody stalk ten or twelve feet high, covered with a wrinkled gray bark, sending out many branches toward the top, which are garnished with oblong oval leaves of a lucid green, and of a thick consistence; they are five inches long, and two and a half broad, rounded at both ends, but terminate with an acute point. These are placed opposite, and have short foot-stalks. The flowers come out in pretty large roundish bunches at the end of the branches; they are smaller than those of the first sort, and are white, having an agreeable scent. These are succeeded by shorter and rounder pods, which spread from each other horizontally like the former.

The third sort grows naturally in Jamaica, and the other warm islands in America. This rises with a shrubby stalk twelve or fourteen feet high, sending

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out a few branches toward the top which grow erect, and are garnished with oval obtuse leaves four inches long and two broad, placed opposite, and are of a lucid green colour. The flowers are produced in a sort of umbel from the side of the branches; they are small, yellow, and have an agreeable odour, but are not succeeded by seeds in England.

These three sorts are very impatient of cold, so will not live in this country, unless they are placed in a warm stove; they may be propagated by seeds, which must be procured from the countries where the plants grow naturally; these should be sown early in the spring on a hot-bed, and when the plants are come up, and are fit to remove, they must be carefully transplanted into small pots filled with light rich earth, and then plunged into a hot-bed of tanners bark, being careful to shade them in the heat of the day until they have taken new root; after which time, they must have free air admitted to them every day when the weather is warm; but if the nights should prove cold, the glasses of the hot-bed should be covered with mats every evening, soon after the sun goes off from the bed. These plants must be often refreshed with water, but it must not be given to them in large quantities, especially while they are young, for as they are full of a milky juice, they are very subject to rot with much moisture.

The plants may remain during the summer season in the hot-bed, provided the tan is stirred up to renew the heat when it wants, and a little new tan added; but at Michaelmas, when the nights begin to be cold, the plants should be removed, and plunged into the bark-bed in the stove; where, during the winter season, they must be kept in a moderate degree of warmth, and in cold weather they should have but little water given them, lest it should rot them. The plants should constantly remain in the stove, where, in warm weather, they may have free air admitted to them by opening the glasses, but in cold weather they must be kept warm. With this management the plants will thrive and produce their flowers, and as their leaves are always green, they will make a pleasant diversity amongst the tender exotic plants in the stove.

These plants may also be propagated by cuttings during the summer season, which should be cut off from the old plants, and laid to dry in the stove five or six days before they are planted, that the wounded parts may heal, otherwise they will rot. These cuttings should be planted in pots filled with fresh light earth, and plunged into the hot-bed of tanners bark, and closely covered with a hand-glass, observing to shade them from the sun in the middle of the day in hot weather, as also to refresh them now and then with a little water. When the cuttings have taken root, they may be transplanted into separate pots, and treated in the same manner as those which are raised from seeds.

The fourth sort is a perennial plant, which grows naturally in Virginia. This sends up in the spring two or three herbaceous stalks near a foot high, garnished with oblong leaves which are placed alternately; the flowers are produced in small bunches, terminating the stalks; they are white and have no scent, nor are they succeeded by seeds in England.

This plant had the title of Amsonia given to it by Mr. Clayton, who first discovered it in Virginia.

As it does not produce seeds in England, so the plants are at present very rare in the gardens, for the roots do not send out many offsets. This plant will thrive in the open air here, provided it is planted in a warm situation; it loves a light soil, rather moist than otherwise; but if it is planted in dry ground, it should be frequently watered in dry weather.

TACAMAHACA. See POPULUS.

TAGETES. Tourn. Inst. R. H. 478. tab. 278. Lin. Gen. Plant. 865. African or French Marigold; in French, *Oeillet d'Inde*.

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The CHARACTERS are,

The common empalement of the flower is single, of one leaf, oblong, erect, and five-cornered; the flower is compound and radiated; the rays or border is composed of female half florets which are tongue-shaped. The disk or middle is made up of hermaphrodite florets which are tubulous, and cut into five obtuse segments; these have five short hair-like stamina, terminated by cylindrical summits, and an oblong germen supporting a short slender style, crowned by a thin, bifid, reflexed stigma. The germen afterward becomes a single, linear, compressed seed, almost the length of the empalement, crowned by five acute-pointed unequal scales. The female half florets have an oblong germen, with a style and stigma like the hermaphrodite, and are succeeded by seeds of the same form, but have no stamina.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which contains those plants whose flowers are composed of hermaphrodite and female florets which are fruitful, and have their summits connected.

The SPECIES are,

1. TAGETES (*Erecta*) caule simplici erecto, pedunculis nudis unifloris. Hort. Cliff. 418. *Tagetes with a single erect stalk, and naked foot-stalks bearing single flowers.* Tagetes maximus rectus, flore simplici ex luteo pallido. I. B. 3. p. 100. *Greatest upright African Marigold, with a pale, single, yellow flower.*
2. TAGETES (*Patula*) caule subdiviso patulo. Hort. Cliff. 418. *Tagetes with a spreading subdivided stalk.* Tagetes Indicus minor, multiplicato flore. Tourn. Inst. 488. *Smaller Indian Tagetes with double flowers, commonly called French Marigold.*
3. TAGETES (*Minuta*) caule simplici recto, pedunculis squamosis multifloris. Hort. Cliff. 419. *Tagetes with a single erect stalk, and scaly foot-stalks bearing many flowers.* Tagetes multiflora minuto flore albicante. Hort. Elth. 374. *Many-flowering Tagetes with a small white flower.*
4. TAGETES (*Rotundifolia*) caule simplici erecto, foliis cordatis simplicibus, pedunculis nudis unifloris. *Tagetes with a single stalk, simple heart-shaped leaves, and naked foot-stalks having one flower.* Tagetes Americana, folio singulari subrotundo. Houst. MSS. *American Tagetes with a single roundish leaf.*

The first sort grows naturally in Mexico, but has been long cultivated in the English gardens, where it is commonly titled African, or African Marigold; of this there are the following varieties:

1. Pale yellow, or brimstone colour, with single, double, and fistulous flowers.
2. Deep yellow, with single, double, and fistulous flowers.
3. Orange-coloured, with single, double, and fistulous flowers.
4. Middling African, with Orange-coloured flowers.
5. Sweet-scented African.

These are all very subject to vary, so that unless the seeds are very carefully saved from the finest flowers, they are very apt to degenerate; nor should their seeds be too long sown in the same garden without changing it, for the same reason; therefore, those who are desirous to have these flowers in perfection, should exchange their seeds with some person of integrity at a distance, where the soil is of a different nature, at least every other year. If this is done, the varieties may be continued in perfection.

This plant is so well known as to need no description. It flowers from the beginning of July till the frost puts a stop to it. The second sort grows naturally in Mexico, but has been long in the English gardens, where it is distinguished from the first by the title of French Marigold.

Of this there are several varieties, some of which have much larger flowers than others, and their colour varies greatly; there are some which are beautifully variegated, and others quite plain; but as these are accidents arising from culture, so they do not merit farther distinction, for I have always found that seeds saved from the most beautiful flowers will dege-

nerate, especially if they are sown in the same garden for two or three years together, without changing the seed.

These plants are annual, so must be propagated from seeds every spring, which may be sown upon a moderate hot-bed the beginning of April; and when the plants are come up, they should have plenty of fresh air, for if they are drawn too much, they will not afterward become handsome, notwithstanding they have all possible care taken of them. When they are about three inches high, they should be transplanted on a very moderate hot-bed, which may be arched over with hoops, and covered with mats, for these plants are hardy enough to be brought up without glasses; in this bed they should be planted about six inches asunder each way, observing to water and shade them until they have taken root; but as the plants acquire strength, they should be inured to bear the open air by degrees, and about the beginning of May they should be taken up, with a ball of earth to the root of each plant, and planted into the borders of the parterre-garden, or into pots, for furnishing the courts, &c. shading them carefully from the sun till they have taken new root, and also supplying them duly with water. When their flowers appear, if any should prove single, the plants should be destroyed, and then those in pots may be removed to the court where the several varieties, being intermixed with other annual plants, afford an agreeable variety.

These plants have a strong disagreeable scent, especially when handled, for which reason they are not so greatly esteemed for planting near habitations; but the flowers of the sweet-scented sort, being more agreeable, are generally preferred, especially for planting in small gardens.

The third sort grows naturally in Chili in the Spanish West-Indies. This is a plant of taller growth than either of the former. The stalk is single, erect, and branches a little toward the top; it rises about ten feet high; the branches grow erect. The leaves are narrower than either of the other. The foot-stalks of the flowers are scaly and stand erect, close to the stalk; these sustain three or four small white flowers, which appear very late in autumn, so that unless it is kept in a glass-case the seeds will not ripen here. This plant has very little beauty, so is only preserved for the sake of variety.

The fourth sort rises with an upright stalk about two feet high, sending out a few branches toward the top, garnished with heart-shaped leaves standing upon long slender foot-stalks; those on the lower part of the stalk are two inches and a half long, and one and a half broad toward their base, ending in very acute points, being in shape like those of the black Poplar, rough to the touch, and are slightly crenated on their edges; the branches and stalks are each terminated by one large yellow flower standing upon a long naked foot-stalk. The empalement of the flower is short; the leaves of which it is composed are oblong and oval, drawing to a point. The female florets, which compose the rays or border, are much longer than the empalement. The hermaphrodite florets in the disk or middle are equal; they are of a deep yellow colour, and make a good appearance, for the flowers are double. This plant was discovered by the late Dr. Houstoun growing naturally at La Vera Cruz in New Spain, from whence he sent the seeds to England.

The two last sorts are not so hardy as the former, so the seeds of these should be sown earlier in the spring upon a good hot-bed, and when the plants are fit to remove, they should be transplanted on a fresh hot-bed, at about three inches distance each way, observing to shade them from the sun till they have taken new root, then they should be treated in the same way as the Amaranthus, and other tender annual plants, being careful not to draw them up weak; when they have spread so as to meet each other, they should be taken up with balls of earth to their roots, and planted in pots with light rich earth, and plunged into a hot-bed under a deep frame, where the plants

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May have room to grow, being careful to shade them from the sun till they have taken new root, after which they must have air and water in proportion to the warmth of the season; and when the plants are grown too tall to remain longer in the frame, they should be removed to an airy glass-case, where they may stand to flower and ripen their seeds.

TAMARINDUS. Tourn. Inst. R. H. 660. tab. 445. Lin. Gen. Plant. 46. *The Tamarind-tree.*

The CHARACTERS are,

The empalement of the flower is composed of four oval plain leaves which are equal; the flower has five petals which are almost like those of the butterfly kind, one of them standing erect, two are placed like wings on each side, and two reflect downward; it has three awl-shaped stamina situated in the sinuses of the empalement, and are arched toward the upper petal, terminated by single summits, and an oblong oval germen supporting an awl-shaped ascending style, crowned by a single stigma. The germen afterward becomes a long, swelling, compressed pod, having a double cover, and one cell containing three, four, or five angular compressed seeds, surrounded with pulp.

This genus of plants is ranged in the first section of Linnæus's third class, which includes those plants whose flowers have three stamina and one style.

We know but one SPECIES of this genus, viz.

TAMARINDUS (*Indica*.) Hort. Cliff. 18. *The Tamarind-tree.* Siliqua Arabica, quæ Tamarindus. C. B. P. 403. *The Arabian Pod or Tamarind.*

This tree grows naturally in both Indies, and also in Egypt; but it has been supposed by some eminent botanists, that the Tamarind which grew in the East-Indies, was different from that of the West, because the pods of the first are almost double the length of those of the latter. The pods which have been brought me from the East-Indies, have generally been so long as to contain five, six, and sometimes seven seeds, whereas those of the West-Indies have very rarely more than three or four; but the plants which I have raised from the seeds of both sorts, are so like as not to be distinguished; therefore I suppose it may be owing to the soil, or culture, that one is so much larger than the other.

This grows to a very large size in those countries where it is a native, but in England it will not thrive out of a stove, especially in winter. The stem is very large, covered with a brown bark, and divides into many branches at the top, which spread wide every way, and are closely garnished with winged leaves, composed of sixteen or eighteen pair of lobes, without a single one at the end. The lobes are about half an inch long, and a sixth part of an inch broad, of a bright green, a little hairy, and sit close to the midrib. The flowers come out from the side of the branches, five, six, or more together upon the same foot-stalk, in loose bunches; these are composed of five reddish petals, one of which is reflexed upward like the standard in some of the butterfly flowers, two others stand on each side like the wings, and the other two are turned downwards; these, in the countries where the plants grow naturally, are succeeded by thick compressed pods, two, three, four, or five inches long, having a double skin or cover, and swell in every place where the seeds are lodged, full of an acid stringy pulp, which surrounds smooth, compressed, angular seeds.

The Tamarinds which are brought from the East-Indies are darker and drier, but contain more pulp, being preserved without sugar, and are fitter to be put into medicines than those from the West-Indies, which are much redder, have less pulp, and are preserved with sugar, so are pleasanter to the palate.

The plants are preserved in the gardens of those who have conveniency to maintain rare exotic trees and shrubs.

They are easily propagated by sowing their seeds on a hot-bed in the spring; and when the plants are come up, they should be planted each into a separate small pot filled with light rich earth, and plunged into a hot-bed of tanners bark to bring them forward, ob-

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serving to water and shade them until they have taken root; and as the earth in the pots appears dry, they must be watered from time to time, and should have air given to them in proportion to the warmth of the season, and the bed in which they are placed; when the pots in which they are planted are filled with their roots, the plants should be shifted into pots of a larger size, which must be filled up with rich light earth, and again plunged into the hot-bed, giving them air, as before, according to the warmth of the season; but in very hot weather the glasses should be shaded with mats in the heat of the day, otherwise the sun will be too violent for them through the glasses; nor will the plants thrive, if they are exposed to the open air, even in the warmest season; so that they must be constantly kept in the bark-stove both summer and winter, treating them as hath been directed for the Coffee-tree, with whose culture they will thrive exceeding well.

These plants, if rightly managed, will grow very fast; for I have had them upwards of three feet high in one summer from seed, and have had two plants which produced flowers the same season they were sown; but this was accidental, for none of the older plants have produced any flowers, although I have several plants of different ages, some of which are above twenty years old, and about fifteen feet high, with large spreading heads.

TAMARIX. Lin. Gen. Plant. 75. Tamariscus. Tourn. Inst. R. H. 661. *The Tamarisk.*

The CHARACTERS are,

The empalement of the flower is obtuse, erect, and permanent; it is cut into five parts; the flower has five oval concave petals which spread open, and five hair-like stamina terminated by roundish summits; it has an acute-pointed germen without a style, crowned by three oblong, feathery, twisted stigmas. The germen afterward turns to an oblong acute-pointed capsule with three corners, having one cell, opening with three valves, containing many small downy seeds.

This genus of plants is ranged in the third section of Linnæus's fifth class, which includes those plants whose flowers have five stamina, and three styles or stigmas.

The SPECIES are,

1. TAMARIX (*Gallica*) floribus pentandris. Hort. Cliff. 111. *Tamarisk with flowers having five stamina.* Tamariscus Narbonensis. Lob. Icon. 218. *French Tamarisk.*

2. TAMARIX (*Germanica*) floribus decandris. Hort. Cliff. 111. *Tamarisk whose flowers have ten stamina.* Tamariscus Germanica. Lob. Icon. 218. *German Tamarisk.* The first sort grows naturally in the south of France, in Spain and Italy, where it grows to a tree of middling size, but in England is seldom more than fourteen or sixteen feet high. The bark is rough, and of a dark brown colour; it sends out many slender branches, most of which spread out flat and hang downward at their ends; these are covered with a Chestnut-coloured bark, and garnished with very narrow finely divided leaves, which are smooth, of a bright green colour, and have small leaves or indentures which lie over each other like scales of fish. The flowers are produced in taper spikes at the end of the branches, several of them growing on the same branch. The spikes are about an inch long, and as thick as a large earthworm. The flowers are set very close all round the spike; they are very small, and have five concave petals of a pale flesh colour, with five slender stamina terminated by roundish red summits. The flowers appear in July, and are succeeded by oblong, acute-pointed, three-cornered capsules, filled with small downy seeds, which seldom ripen in England.

The wood, bark, and leaves of this tree are used in medicine, and are accounted specific for all disorders of the spleen, as being believed to lessen it much. The bark is sometimes used for rickets in children.

The second sort grows naturally in Germany, in moist land; this is rather a shrub than tree, having several ligenous stalks arising from the same root, which grow

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grow erect, sending out many side-branches which are also erect; they have a pale green bark when young, which afterward changes to a yellowish colour. The leaves are shorter, and set closer together than those of the other sort, and are of a lighter green, approaching to a gray colour; the flowers are produced in long loose spikes at the end of the branches, standing erect; they are larger than those of the former, and have ten stamina standing alternately. It flowers about the same time as the former.

These both cast their leaves in autumn, and it is pretty late in the spring before the young ones push out, which renders them less valuable; they are now frequently planted in gardens for ornament, and, when they are mixed with other shrubs, make a pretty variety.

They may be easily propagated by laying down their tender shoots in autumn, or by planting cuttings in an east border, which, if supplied with water in the spring before they begin to shoot in dry weather, will take root in a short time; but they should not be removed until the following autumn, at which time they may be either placed in a nursery to be trained up two or three years, or else into the quarters where they are designed to remain, observing to mulch their roots, and water them according as the season may require, until they have taken root; after which, the only culture they will require is to prune off the straggling shoots, and keep the ground clean about them.

TAMUS. Lin. Gen. Plant. 991. Tamnus. Tourn. Inst. R. H. 102. tab. 28. The black Briony.

The CHARACTERS are,

It has male and female flowers on different plants. The male plants have empalements, composed of six oval spear-shaped leaves, which spread wide at the top; they have no petals, but have six short stamina, terminated by erect summits; the female flowers have bell-shaped empalements of one leaf, cut into six spear-shaped segments, which sit upon the germen; these have no petals, but have oblong punctured nectarii sitting on the inside of each segment of the empalement, and a large, oblong, oval, smooth germen under the empalement, with a cylindrical style, crowned by three reflexed indented stigmas. The germen afterward becomes an oval berry with three cells, including two glo-bular seeds.

This genus of plants is ranged in the sixth section of Linnæus's twenty-second class, which includes those plants whose male flowers are upon distinct plants from the fruit, and the male flowers have six stamina.

The SPECIES are,

1. TAMUS (Communis) foliis cordatis indivisis. Hort. Cliff. 458. *Tamus with heart-shaped undivided leaves.* Bryonia lævis sive nigra racemosa. C. B. P. 297. *Common black Briony.*

2. TAMUS (Cretica) foliis trilobis. Lin. Sp. Plant. 1028. *Tamus with leaves which are divided into three lobes.* Tamus Cretica, trifido folio. Tourn. Cor. 3. *Black Briony of Crete with a trifid leaf.*

The first sort is rarely cultivated in gardens, but grows wild under hedges in divers parts of England, and is there gathered for medicinal use. The root is very large, fleshy, and has a dark brown skin or cover; the stalks are smooth, and twine round any neighbouring support, whereby they rise to the height of ten or twelve feet; they are garnished with smooth heart-shaped leaves of a lucid green, which are produced alternately. The flowers are produced in long bunches from the side of the stalks; those of the male plants fall off soon after their farina is cast abroad, but the female flowers are succeeded by oval smooth berries which are red when ripe. It flowers in July, and the fruit ripens in autumn.

It may be easily propagated by sowing their seeds soon after they are ripe, under the shelter of bushes, where, in the spring, the plants will come up, and spread their branches over the bushes, and support themselves, requiring no farther care, and their roots will abide many years in the ground without decaying.

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The second sort was discovered in the island of Crete by Dr. Tournefort, who sent the seeds to the Royal Garden at Paris; this has a rounder root than the other. The stalks twine round any neighbouring support in like manner; the leaves of this are divided into three lobes, in which the principal difference consists. This is an abiding plant, which is hardy enough to live in the full ground in England, and may be propagated as the other.

TANACETUM. Tourn. Inst. R. H. 461. tab. 261. Lin. Gen. Plant. 848. Tansey; in French, *Tanefie*.

The CHARACTERS are,

It has a flower composed of hermaphrodite and female florets, contained in one common hemispherical imbricated empalement, whose scales are compact and acute-pointed. The hermaphrodite florets, which compose the disk of the flower, are funnel-shaped, and cut at the top into five segments which are reflexed; these have five short hair-like stamina, terminated by cylindrical tubulous summits, and a small oblong germen, supporting a slender style, crowned by a bifid revolved stigma. The germen afterward becomes an oblong naked seed. The female florets are trifid, which compose the rays or border, and are deeply divided within; these have an oblong germen, with a slender style, crowned with two reflexed stigmas, but no stamina. This genus of plants is ranged in the second section of Linnæus's nineteenth class, which contains the plants whose flowers are composed of hermaphrodite and female florets which are fruitful, and their summits are connected.

The SPECIES are,

1. TANACETUM (Vulgare) foliis bipinnatis incisiss serratis. Hort. Cliff. 398. *Tansey with doubly-winged cut leaves which are sawed.* Tanacetum vulgare luteum. C. B. P. 132. *Common yellow Tansey.*

2. TANACETUM (Sibericum) foliis pinnatis, laciniis linearis-filiformibus, corymbus glabris, caule herbaceo. Lin. Sp. Plant. 844. *Tansey with winged leaves which are cut into linear thread-like segments, a smooth corymbus, and an herbaceous stalk.* Tanacetum foliis pinnatis multifidis, laciniis linearibus trifidis. Flor. Sibir. 2. p. 134. *Tansey with many-pointed winged leaves, having trifid linear segments.*

3. TANACETUM (Balsamita) foliis ovatis integris serratis. Hort. Cliff. 398. *Tansey with oval, entire, sawed leaves.* Balsamita major. Dod. Pempt. 296. *Costmary, or Alecoast.*

4. TANACETUM (Frutescens) foliis pinnatifidis, laciniis lanceolatis obtusiusculis integerrimis. Lin. Sp. Plant. 844. *Tansey with wing-pointed leaves, having spear-shaped, entire, obtuse segments.* Tanacetum Africanum arborescens, foliis lavendulæ multifido folio. H. Amst. 2. 210. *African-tree Tansey, with a leaf like the cut-leaved Lavender.*

5. TANACETUM (Suffruticosum) foliis pinnato-multifidis, laciniis linearibus subdivisis, acutis caule suffruticoso. Hort. Cliff. 398. *Tansey with many-pointed winged leaves, having linear segments which are acutely divided, and an under shrub stalk.* Tanacetum Africanum, frutescens, foliis lavendulæ multifidæ, longè minoribus, graveolens. Boerh. Ind. Plant. 1. p. 124. *Shrubby African Tansey, with leaves like the cut-leaved Lavender, but much smaller and stronger scented.*

6. TANACETUM (Crithmifolium) foliis pinnatis, pinnis linearibus remotis integerrimis. Lin. Sp. Plant. 843. *Tansey with winged leaves, whose lobes are linear, grow at a distance from each other, and are entire.* Elichrysum Africanum frutescens, foliis crithmi marini. Hort. Amst. 2. p. 113. *Shrubby African Goldy-locks with leaves like Samphire.*

The first sort is the common Tansey which is used in medicine and the kitchen; this grows naturally by the sides of roads, and the borders of fields in many parts of England. It has a fibrous creeping root, which will spread to a great distance where they are not confined, from which rise many channelled stalks, from two to almost four feet high, according to the goodness of the soil, which are garnished with doubly-winged leaves, whose lobes are cut and sharply

sharply sawed; they are of a deep green colour, and have a pleasant grateful odour. The stalks divide near the top into three or four branches which stand erect, and are terminated by umbels of naked yellow flowers, composed of many florets, which are included in hemispherical scaly empalements. These appear in July, and are succeeded by seeds which ripen in September.

There are three varieties of this, one with a curled leaf, which is titled Double Tansey by gardeners; another with variegated leaves, and a third with larger leaves which have little scent; but, as these have accidentally been produced from seeds of the common Tansey, they are not enumerated as distinct species.

This sort is easily propagated by the creeping roots, which, if permitted to remain undisturbed, will in a short time overspread the ground where they are permitted to grow; so that wherever this is planted in a garden, the slips should be placed at least a foot asunder, and in particular beds, where the paths round them may be often dug, to keep their roots within bounds. They may be transplanted either in spring or autumn, and will thrive in almost any soil or situation.

The common Tansey is greatly used in the kitchen early in the spring; at which season, that which is in the open ground, or especially in a cold situation, is hardly forward enough to cut, so that where this is much wanted at that season, it is the best way to make a gentle hot-bed in December, and plant the old roots thereon without parting them, and arch the bed over with hoops, to cover it with mats in cold weather, by which method the Tansey will come up in January, and be fit to cut in a short time after.

The second sort grows naturally in Siberia; this has a perennial fibrous root; the stalks rise more than two feet high; the leaves are narrow and winged; the lobes are very narrow, and end in two or three points which are entire; the flowers are produced in small thin umbels from the side, and at the top of the stalk; they are yellow and but small, the umbels having few flowers in each. This flowers in June and July, and the seeds ripen in autumn: it may be propagated in the same way as the first.

The third sort grows naturally in the south of France and Italy, but is here planted in gardens, and was formerly pretty much used in the kitchen, and also in medicine. The roots of this are hardy, fleshy, and creep in the ground; the lower leaves are oval and entire; they are near three inches long, and one inch and a half broad, sawed on their edges, of a grayish colour, and have long foot-stalks. The stalks rise from two to three feet high, and send out branches from the side; they are garnished with oval sawed leaves like those at the bottom, but smaller, and sit close to the stalk. The flowers are produced at the top of the stalks in a loose corymbus; they are naked, and of a deep yellow colour; these appear in August, but are not succeeded by seeds in England. The whole plant has a soft pleasant odour.

It is propagated easily by parting of their roots: the best time for this is in autumn, that they may be well established in the ground before spring. Where this plant is cultivated for use, the plants should be planted in beds at two feet distance every way, that they may have room to grow; for in two years the roots will meet, so every other year they should be transplanted and parted to keep them within compass; they will thrive in almost any soil or situation, but will continue longest in dry land.

The fourth sort grows naturally at the Cape of Good Hope; this rises with a shrubby stalk eight or ten feet high, sending out branches on every side the whole length, which are garnished with wing-pointed leaves, whose segments are spear-shaped, entire, and blunt-pointed. The flowers are produced in small roundish bunches at the end of the branches; they are of a sulphur colour, and appear in May, but there

is a succession of flowers on the same plant great part of summer. The seeds rarely ripen in England.

The fifth sort was brought from the Cape of Good Hope, where it grows naturally; this rises with a branching shrubby stalk three or four feet high, garnished with wing-pointed leaves whose lobes are very narrow, and frequently cut into acute segments. The flowers are produced in small roundish bunches at the end of the branches; they are larger than those of the former sort, and are of a bright yellow colour. It flowers about the same time with the former.

The sixth sort grows naturally at the Cape of Good Hope; this has a thick shrubby stalk, covered with a gray bark, which rises seven or eight feet high, sending out many branches on every side, which are closely garnished with linear-winged leaves, whose lobes or pinnæ are very narrow, and spread from each other. The leaves sit close to the stalks on every side; the branches are terminated by close, large, roundish bunches of bright yellow flowers. Some of the foot-stalks sustain but one, others two, three, or four flowers upon each, which begin to appear the beginning of July, and there is a succession of them on the same plants till late in autumn; and those which come early in the season, will be succeeded by seeds which ripen in winter.

The three last-mentioned sorts are too tender to live through winter in the open air, so must be kept in pots, and removed into shelter before hard frosts come on; they are all of them easily propagated by cuttings, which may be planted in a bed of loamy earth, during any of the summer months; these should be shaded from the sun until they have taken root, and must be frequently refreshed with water. When they have good roots, they should be taken up with balls of earth about their roots, and planted in pots, placing them in a shady situation till they have taken new root; then they may be removed to a sheltered situation, placing them among other hardy exotic plants, where they may remain till late in October, when they must be put into shelter. These plants are so hardy as only to require protection from hard frost, so must not be tenderly treated, and in mild weather should always be as much exposed to the air as possible, to prevent their drawing weak.

TAN, or TANNERS BARK is the Bark of the Oak-tree, chopped or ground into coarse powder, to be used in tanning or dressing of skins, after which it is of great use in gardening: first, by its fermentation (when laid in a proper quantity,) the heat of which is always moderate, and of a long duration, which renders it of great service for hot-beds; and secondly, after it is well rotted, it becomes excellent manure for all sorts of cold stiff land, upon which one load of Tan is better than two of rotten dung, and will continue longer in the ground.

The use of Tan for hot-beds has not been many years known in England. The first hot-beds of this sort, which were made in England, were at Blackheath in Kent, above fourscore years ago; these were designed for the raising of Orange-trees, but the use of these hot-beds being but little known at that time, they were made but by two or three persons, who had learned the use of them in Holland and Flanders, where the gardeners seldom make any other hot-beds; but in England there were very few hot-beds made of Tanners Bark before the Ananas plants were introduced into this country, which was in 1719, since which time the use of these hot-beds has been more general, and are now made in all those gardens where the Ananas plants are cultivated, or where there are collections of tender exotic plants preserved; and the gardeners here are now better skilled in the making and managing of these hot-beds than in most other countries, which might render it less necessary to give a full description of them here; but yet, as there may be some persons in the remote parts of England, who have not had an opportunity of informing themselves of the use of Tanners Bark for this purpose, I shall insert

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fert the shortest and plainest method of making and managing these hot-beds, as they are practised by the most knowing persons, who have long made use of these hot-beds; and first, I shall begin with the choice of the Tan.

The tanners in some parts of England do not grind the Bark to reduce it into small pieces, as is commonly practised by the tanners near London, where there is great difference in the size of the bark, some being ground much smaller than the other, according to the different purposes for which it is intended; but in many places the Bark is only chopped into large pieces, which renders it very different for the use of hot-beds; for if the Tan is very coarse, it will require a longer time to ferment than the small Tan; but when it begins to heat, it will acquire a much greater degree, and will retain the heat a much longer time than the small; therefore where there is choice, the middling-sized Tan should be preferred, for it is very difficult to manage a hot-bed when made of the largest Tan; the heat of which is often so great, as to scald the roots of plants, if the pots are fully plunged into the bed; and I have known this violent heat continue upward of two months, so that it has been unsafe to plunge the pots more than half their depth into the Tan, till near three months after the beds have been made; therefore where the persons, who have the care of these beds, do not diligently observe their working, they may in a short time destroy the plants which are placed in the beds: on the other hand, if the Tan is very small, it will not retain the heat above a month or six weeks, and will be rotten and unfit for a hot-bed in a short time; so that where the middle-sized Tan can be procured, it should always be preferred to any other.

The Tan should be always such as been newly taken out of the pits, for if it lies long in the tanners yard before it is used, the beds seldom acquire a proper degree of heat, nor do they continue their heat long; so that when it has been more than a fortnight or three weeks out of the pit, it is not so good for use as that which is new. If the Tan is very wet, it will be proper to spread it abroad for two or three days, to drain out the moisture, especially if it is in autumn or winter season, because then, as there will be little sun to draw a warmth into the Tan, the moisture will prevent the fermentation, and the beds will remain cold; but in the summer season, there is no great danger from the moisture of the Tan. The heat of the sun through the glasses will be then so great, as soon to cause a fermentation in the Tan.

These Tan-beds should be always made in pits having brick-walls round them, and a brick pavement at the bottom, to prevent the earth from mixing with the Tan, which will prevent the Tan from heating. These pits must not be less than three feet deep, and six feet in width, but seven is better; the length must be in proportion to the number of plants they are to contain, but if they are not ten feet in length, they will not retain their heat long; for where there is not a good body of Tan, the outside of the bed will soon lose its heat, so that the plants which are there plunged, will have no benefit of the warmth, nor will the middle of these beds retain their heat long, so that they will not answer the purpose for which they are intended.

When the Tan is put into the bed, it must not be beaten or trodden down too close, for that will cause it to adhere, and form one solid lump, so that it will not acquire a proper heat; nor should it be trodden down at the time when the pots are plunged into the beds, to avoid which there should be a board laid cross the bed, which should be supported at each end, to prevent its resting upon the Tan, upon which the person should stand who plunges the pots, so that the Tan will not be pressed down too close. When the Tan is quite fresh, and has not been out of the pits long enough to acquire a heat, the beds will require a fortnight, or sometimes three weeks, before they will be of a proper temperature of warmth to receive the

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plants; but in order to judge of this, there should be three or four sticks thrust down into the Tan, about eighteen inches deep, in different parts of the bed, so that by drawing out the sticks, and feeling them at different depths, it will be easy to judge of the temper of the bed; and it will be proper to let a few of these sticks remain in the bed after the plants are plunged, in order to know the warmth of the Tan, which may be better judged of by feeling these sticks, than by drawing out the pots, or plunging the hand into the Tan.

When the Tan is good, one of these beds will retain a proper degree of heat for near three months; and when the heat declines, if the Tan is forked up and turned over, and some new Tan added to it, the heat will renew again, and will continue two months longer; so that by turning over the Tan, and adding some new Tan every three months or thereabouts, as the bed is found to decline of its heat, they may be continued one year, but every autumn it will be proper to take out a good quantity of the old Tan, and to add as much new to the bed, that the heat of the bed may be kept up in winter; for if the heat is suffered to decline too much during the cold season, the plants will suffer greatly; to prevent this, there should always be some new Tan added to the bed in winter, when the heat is found to decline; but the Tan should be laid in a dry place a week or ten days to dry, before it is put into the bed, otherwise the moisture will chill the old Tan in the bed, and prevent the fermentation; so that unless the Tan is turned over again, there will be little or no heat in the beds, which often proves fatal to the plants which are plunged in them; therefore whoever has the management of these beds, should be very careful to observe constantly the warmth of the Tan, since, upon keeping the beds in a due temperature of warmth, their whole success depends; and where this caution is not taken, it frequently happens that the Ananas plants run into fruit very small, or the plants are infected by insects, both which are occasioned by the growth of the plants being stopped by the decline of the heat of the Tan; therefore great regard must be had to that, especially in winter.

The great advantages which these tan-beds have of those which are made of horse-dung, are the moderate degree of heat which they acquire, for their heat is never so violent as that of horse-dung, and they continue this heat much longer; and when the heat declines, it may be renewed, by turning the beds over, and mixing some new Tan with the old, which cannot be so well done with horse-dung; and likewise the beds will not produce so great steams, which are often injurious to tender plants, so that these Tan-beds are much preferable to those of horse-dung for most purposes.

Tan, when it is well rotted, is also an excellent manure for all cold and stiff lands; and if it is laid upon Grass ground in autumn, that the rains in winter may wash it into the ground, it will greatly improve the Grass; but when it is used new, or in the spring of the year, when dry weather comes soon after, it is apt to cause the Grass to burn, which has occasioned the disuse of Tan in many places; but if properly used, it will be found an excellent dressing for all stiff lands.

T A P I A. See CRATEVA.

T A R C H O N A N T H U S. Lin. Gen. Plant. 846.

The CHARACTERS are,

It has a flower composed of several hermaphrodite florets, included in one common top-shaped empalement, which is short, permanent, and hairy. The florets are uniform, funnel-shaped, and of one petal, indented in five parts at the top; they have each five very short hair-like stamina, terminated by cylindrical tubulous summits longer than the petal, and an oblong germen, supporting a style the length of the stamina, crowned by two awl-shaped stigmas which open lengthways. The germen afterward turns to a single oblong seed, crowned with down, which ripens in the empalement.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which includes those plants whose flowers are made up of all fruitful florets, and their summits are connected together.

We have but one SPECIES of this genus, viz.

TARCHONANTHUS (*Camphoratus*.) Hort. Cliff. 398. *Conyza Africana*, frutescens, foliis salviæ odore camphoræ. Tourn. Inst. 455. *Shrubby African Fleabane*, with Sage leaves smelling like Camphire.

This plant grows naturally at the Cape of Good Hope, and also in China; it has a strong woody stalk, which in England rises to the height of twelve or fourteen feet; sending out many ligneous branches at the top, which may be trained up to have a regular head. The branches are garnished with leaves, which are in shape like those of the broad-leaved Sallow, having a downy surface like those of Sage, and their under sides are white; they resemble in smell the Rosemary leaves when bruised. The flowers are produced in spikes at the extremity of the shoots, which are of a dull purple colour, so do not make any great appearance. The usual time of its flowering is in autumn, but continue great part of winter, and are not succeeded by seeds here. These plants are preserved to make a variety in the green-house during the winter season, by those who are curious in collecting of foreign plants; they retain their leaves all the year.

It is too tender to live through the winter in the open air in England, but requires no artificial heat, therefore may be placed in a common green-house with Myrtles, Oleander, and other hardy exotic plants in winter, and in summer may be exposed with them in the open air, and treated in the same manner as they are.

It may be propagated by cuttings, which should be planted in May, in pots filled with light earth, and if they are plunged into a moderate hot-bed, it will promote their putting out roots. These should be shaded with mats, or covered with oiled paper, to screen them from the sun until they are rooted. By the middle of July these cuttings will have taken root, when they should be each transplanted into a separate pot, and placed in the shade until they have taken new root; after which time they may be placed with other hardy exotic plants in a sheltered situation, where they may remain till the middle or end of October, when they should be removed into the green-house, placing them where they may have a large share of air in mild weather. This plant is very thirsty, so must be often watered, and every year the plants must be shifted; and as they increase in size, should be put into larger pots.

TARRAGON. See **ABROTANUM**.

TAXUS. Tourn. Inst. R. H. 589. tab. 362. Lin. Gen. Plant. 1006. [so called of *τάξις*, poisons; because this tree, in old time, was used in compounding poisons in warm climates.] The Yew-tree; in French, *If*.

The CHARACTERS are,

The male flowers are produced on separate trees from the fruit for the most part; they have neither empalement or petals, but the gem is like a four-leaved cover; they have a great number of stamina which are joined at the bottom in a column longer than the gem, terminated by depressed summits, having obtuse borders and eight points, opening on each side their base, casting their farina. The female flowers are like the male, having no empalement or petals, but have an oval acute-pointed germen, but no style, crowned by an obtuse stigma. The germen afterward becomes a berry lengthened from the receptacle, globular at the top, and covered by a proper coat at bottom, open at the top, full of juice, and of a red colour; but as it dries, wastes away, including one oblong oval seed, whose top without the berry is prominent.

This genus of plants is ranged in the eleventh section of Linnæus's twenty-second class, which includes those plants whose male flowers are upon separate plants from the fruit, and their stamina are joined in one body or column.

We have but one SPECIES of this plant in England, viz.

TAXUS (*Baccas*) foliis approximatis. Lin. Sp. Plant. 1040. *Yew-tree with leaves growing near each other, or the common Yew.*

This tree grows naturally in England, and also in most of the northern countries of Europe, and in North America; and where, if it is suffered to grow, will rise to a good height, and have very large stems; it naturally sends out branches on every side, which spread out, and are almost horizontal; they are closely garnished with narrow, stiff, blunt-pointed leaves, of a very dark green. The flowers come out from the side of the branches in clusters; the male flowers having many stamina, are more conspicuous than the female; these for the most part are upon different trees, but sometimes are upon the same tree; they appear the latter end of May, and the berries ripen in autumn.

There is hardly any sort of evergreen tree which has been so generally cultivated in the English gardens as the Yew, upon the account of its being so sensible, as to be with ease reduced into any shape the owner pleased; and it may be too often seen, especially in old gardens, what a wretched taste of gardening prevailed formerly in England, from the monstrous figures of beasts, &c. we find these trees reduced into; but of late this taste has been justly exploded by persons of superior judgment, for what could be more absurd than the former methods of planting gardens? where, those parts next the habitation, were crowded with a large quantity of these and other sorts of evergreen trees, all of which were clipped into some trite figure or other, which, besides the obstructing the prospect from the house, and filling up the ground, so that little room was left for other shrubs and flowers. Beside, it occasioned an annual expence to render the trees disagreeable; for there never was a person, who had considered the beauty of a tree in its natural growth, with all its branches diffused on every side, but must acknowledge such a tree infinitely more beautiful than any of those shorn figures, so much studied by persons of a groveling imagination.

The only use this tree is fit for in gardens, is to form hedges for the defence of exotic plants; for which purpose, when it is necessary to have hedges, it is the most proper of any tree in being; the leaves being small, the branches are produced very close together; and if carefully shorn, they may be rendered so close as to break the winds better than any other sort of fence whatever, because they will not be reverberated, as against walls, pales, or other close fences, therefore consequently are much to be preferred for such purposes.

These trees may be easily propagated by sowing their berries in autumn, as soon as they are ripe (without clearing them from the pulp which surrounds them, as hath been frequently directed,) upon a shady bed of fresh undunged soil, covering them over about half an inch thick with the same earth.

In the spring the bed must be carefully cleared from weeds, and if the season proves dry, it will be proper to refresh the bed with water now and then, which will promote the growth of the seeds, many of which will come up the same spring, but others will remain in the ground until autumn or spring following; but where the seeds are preserved above ground till spring before they are sown, the plants never come up till the year after; so that by sowing the seeds as soon as they are ripe, there is often a whole year saved.

These plants, when they come up, should be constantly cleared from weeds, which, if permitted to grow amongst them, will cause their bottoms to be naked, and frequently destroy the plants when they continue long undisturbed.

In this bed the plants may remain two years, after which, in autumn, there should be a spot of fresh undunged soil prepared, into which they should be removed the beginning of October, planting them in beds about four or five feet wide, in rows about a

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foot asunder, and six inches distance from each other in the rows, observing to lay a little mulch upon the surface of the ground about their roots, as also to water them in dry weather until they have taken root; after which they will require no farther care, but to keep them clear from weeds in summer, and to trim them according to the purpose for which they are designed.

In these beds they may remain two or three years, according as they have grown, when they should again be removed into a nursery, placing them in rows at three feet distance, and the plants eighteen inches asunder in the rows; observing to do it in autumn, as was before directed, and continue to trim them in the summer season, according to the design for which they were intended; and after they have continued three or four years in this nursery, they may be transplanted where they are to remain; always observing to remove them in autumn where the ground is very dry, but on cold moist land it is better in the spring.

These trees are very slow in growing, but yet there are many very large trees upon some barren cold soils in divers parts of England. The timber of these trees is greatly esteemed for many uses.

TELEPHIODES. See **ANDRACHNE**.

TELEPHIUM. Tourn. Inst. R. H. 248. tab. 128. Lin. Gen. Plant. 339. Orpine.

The **CHARACTERS** are,

The empalement of the flower is permanent, composed of five oblong oval leaves which are obtuse, and the length of the petals. The flower has five oblong obtuse petals, and five awl-shaped stamina which are shorter than the petals, terminated by prostrate summits, with a three-cornered acute germen having no style, crowned by three acute spreading stigmas. The germen afterward turns to a short three-cornered capsule with one cell, opening with three valves, containing many round seeds.

This genus of plants is ranged in the third section of Linnæus's fifth class, which contains those plants whose flowers have five stamina, and three styles or stigmas.

We have but one **SPECIES** of this genus in the English gardens, viz.

TELEPHIUM (*Imperati.*) Hort. Upsal. 70. Orpine, or Live long. Telephium legitimum Imperati. Clus. Hist. 77. The true Orpine of Imperatus.

This plant grows naturally in the south of France and Italy. The root is composed of ligneous fibres of a yellowish colour, which spread out wide. The branches or stalks are slender, and trail upon the ground; they are eight or nine inches long, and are garnished with small oval leaves of a grayish colour, smooth and pretty stiff, which are ranged alternately along the stalk, having one longitudinal nerve running through the middle. The flowers are produced at the end of the branches in short thick bunches, which are reflexed like those of the Heliotropium. They are composed of five white petals which spread open and are the length of the empalement, having five very slender stamina terminated by yellow summits. This plant flowers in June and July, and the seeds ripen in autumn.

This may be propagated by seeds, which should be sown in autumn on a bed of fresh light earth, in an open situation; for if they are sown in the spring, the plants will not come up till the following spring. When the plants are come up, they should be thinned so as to leave them six or eight inches asunder; and they must be constantly kept clear from weeds, for if these are permitted to grow, they will soon overbear the plants and destroy them. These plants do not transplant well, so should stand in the place where they were sown. In the summer they will flower, and the seeds will ripen in autumn, which will scatter soon if it is not gathered when ripe; and, if the ground is not disturbed, the plants will come up in plenty, and require no other care than to keep them clear from weeds.

TEREBINTHUS. See **PISTACHIA**.

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TERGIFÆTOUS PLANTS, are such as bear their seeds on the backside of their leaves.

TERNATEA. See **CLITORIA**.

TERRACES. A Terrace is a bank of earth, raised on a proper elevation, so that any person who walks round a garden, may have a better prospect of all that lies round him; and these elevations are so necessary, that those gardens that have them not are deficient.

When the Terraces are rightly situated, they are great ornaments for their regularity and opening, especially when they are well made, and their ascent not too steep.

There are several kinds of Terrace-walks:

1. The great Terrace, which generally lies next to the house.

2. The side or middle Terrace, which is commonly raised above the level of the parterre, lawn, &c.

3. Those Terraces which encompass a garden.

As to the breadth of side Terraces, this is usually decided by its correspondence with some pavilion, or some little jettee or building; but most of all by the quantity of stuff that is to spare for those purposes.

The side Terrace of a garden ought not to be less than twenty feet, and but very seldom wider than thirty.

As for the height of a Terrace, some allow it to be but five feet high; but others more or less, according to their fancies; but more exact persons never allow above five or six feet; and in a small garden, and a narrow Terrace-walk, three feet; and sometimes three feet and a half high, are sufficient for a Terrace eighteen feet wide, and four feet are sufficient for a Terrace of twenty feet wide; but when the garden is proportionably large, and the Terrace is thirty feet wide, then it must be at least five or six feet high.

The noblest Terrace is very deficient without shade, for which Elm-trees are very proper; for no seat can be said to be complete, where there is not an immediate shade almost as soon as out of the house, and therefore these shady trees should be detached from the body and wings of the edifice.

TERENE, earthy, or composed of earth.

TERRESTRIAL, earthy, or that belongs to earth.

TETRACERA. Lin. Gen. Plant. 604.

The **CHARACTERS** are,

The flower has a permanent empalement of six roundish spreading leaves, the three outer are alternate and smaller than the other: it has six small petals which soon fall off, and a great number of stamina which are permanent, and the length of the empalement, terminated by single summits; it has four oval germen supporting a short awl-shaped style, crowned by an obtuse stigma. The germen afterward become four oval reflexed capsules, each having one cell, opening at the seam on the upper side, inclosing one roundish seed.

This genus of plants is ranged in the fourth section of Linnæus's thirteenth class, which includes those plants whose flowers have many stamina and four styles.

We have but one **SPECIES** of this genus, viz.

TETRACERA (*Volubilis.*) Hort. Cliff. 214. Petrea floribus spicatis, foliis lauri scabris. Amman. Herb. 518. Petrea with spiked flowers, and rough leaves resembling those of the Bay-tree.

This plant grows naturally at La Vera Cruz, where it was discovered by the late Dr. Houstoun, who sent it to England. It has a woody stalk which rises to the height of twelve or fourteen feet, covered with a gray bark, sending out several slender ligneous branches which twine about any neighbouring support; they are garnished with oblong oval leaves, whose surface are very rough, near six inches long, and two inches and a half broad, slightly indented on their edges toward their points, and have many transverse veins running from the midrib to the edges; they are placed alternate on their branches, standing upon short foot-stalks, of a grayish colour on their upper surface, and brown on their under. The flowers

Flowers are produced in panicles at the end of the branches; these panicles are composed of three or four short thick spikes which branch out from the lower part of the principal spike, which is much longer and thicker than the other. The flowers have six thin purple petals of the same length as the empalement, which are very fugacious, so that they soon fall off; these sit upon the germen. After the flowers are past, the four germen become so many oval capsules which are reflexed backward; these open lengthways on the upper side, and have each one oblong seed inclosed.

This shrub is very different from that which Dr. Plukenet titles *Fagus Americanus ulmi amplifolius foliis, capsulis bigemellis*. Amalth. 87. though Dr. Linnæus has added this Synonyme to it.

This is propagated by seeds, which must be procured from the countries where the plant naturally grows, which may probably be found in some of the British islands in the West-Indies. I have received it from the island of Bermuda, where it was found by the late Dr. Cressy, who sent me specimens and seeds. These seeds are frequently abortive, for, upon examining them, there was scarce more than a twentieth part which had any kernels, and others appeared fair but were hollow. The seeds should be sown in pots filled with light earth, and plunged into a moderate hot-bed of tanners bark, where they must be treated in the same way as other exotic seeds from the same countries; and as the plants seldom come up the same year, the pots should be removed into the stove before winter, and plunged into the tan-bed between the other pots of plants, where they should remain till spring, when they should be taken out and plunged into a fresh hot-bed of tanners bark, which will bring up the plants if the seeds were good. When the plants are fit to remove, they should be each planted in a separate small pot filled with light earth, and plunged into a good bed of tan, shading them from the sun till they have taken new root; after which their treatment must be the same as for the *Annona*, and the like tender exotic plants, which require to be kept always in the tan-bed.

TETRAGONIA. Lin. Gen. Plant. 551. *Tetragonocarpos*. Boerh. Ind. alt. 262.

The CHARACTERS are,

The flower has a permanent coloured empalement, composed of four oval, plain, deflexed leaves sitting upon the germen. It has no petals, but about twenty hair-like stamina which are shorter than the empalement, terminated by oblong prostrate summits, and a roundish four-cornered germen under the flower, supporting four awl-shaped styles which are recurved and as long as the stamina, with hairy stigmas the length of the styles. The germen afterward becomes a thick capsule with four cells, having four angles which have narrow wings or borders, containing one hard oblong seed in each.

This genus of plants is ranged in the fourth section of Linnæus's twelfth class, which includes those plants whose flowers have about twenty stamina and five styles.

The SPECIES are,

1. **TETRAGONIA** (*Fruticosa*) *foliis linearibus*. Flor. Leyd. Prod. 250. *Tetragonia with linear leaves*. *Tetragonocarpos Africana fruticans, foliis longis & angustis*. H. Amst. 2. p. 205. *African shrubby Tetragonocarpos, with long narrow leaves*.
2. **TETRAGONIA** (*Decumbens*) *foliis ovatis integerrimis, caule fruticoso decumbente*. *Tetragonia with oval entire leaves, and a shrubby trailing stalk*.
3. **TETRAGONIA** (*Herbacea*) *foliis ovatis*. Flor. Leyd. Prod. 250. *Tetragonia with oval leaves*. *Tetragonocarpos Africana, radice magna crassa & carnosa*. Hort. Amst. 2. p. 203. *Tetragonocarpos with a large fleshy root, and oval leaves*.

These plants grow naturally at the Cape of Good Hope, from whence they were first brought to the gardens in Holland. The first sort has slender ligneous stalks which rise three or four feet high, if they

are supported, otherwise they trail upon the ground; they are covered with a light gray bark, and divide into a great number of trailing branches, which when young are succulent, of an herbaceous colour, and covered with small pellucid drops, somewhat like the *Diamond Ficoides*, which reflect the light. As the branches are older, they become more ligneous, and are garnished with thick, succulent, narrow leaves, about half an inch long, and a tenth of an inch broad, concave, and blunt-pointed; these are placed alternate, and at their base come out a cluster of smaller leaves, which have the like pellucid drops as the stalks. The flowers are produced from the wings of the stalks, at every joint toward the end of the branches; sometimes they come up singly, at others there are two, and sometimes three flowers at each joint; these have empalements of five leaves, which spread open and are a little reflexed; they are green without, and yellow within, each having about forty stamina, which are terminated by oblong prostrate summits which fill up the middle of the flower. They appear in July and August, and are succeeded by large four-cornered capsules having four wings or borders, and four cells, each containing one oblong seed, which ripens in winter.

The second sort has larger stalks than the former, which branch out in like manner; the branches trail upon the ground where they are not supported; the young branches are very succulent, and almost as thick as a man's little finger; the leaves are two inches long, and one broad; their surface are covered with very small pellucid drops, as are the stalks. The flowers are larger, and stand upon pretty long foot-stalks, three or four arising from the same points; the empalement, and also the summits, are of a pale sulphur colour. It flowers at the same time with the first.

These may be propagated by cuttings, which should be cut off from the plants a few days before they are planted, that the part where they are cut may be healed, otherwise they will rot, for the leaves and stalks of this plant are very full of moisture. The best time to plant these cuttings is in July, that they may have time to make good roots before winter. These cuttings may be planted on a bed of fresh earth, and if they are shaded from the sun in the heat of the day, it will be of service to them. They should be frequently refreshed with water, but they must not have it in too great plenty, for that will rot them. In about six weeks after planting, the cuttings will be sufficiently rooted to transplant, therefore they should be taken up, and planted into pots filled with light fresh undunged earth, and placed in a shady situation until they have taken new root, after which time they may be placed with other hardy exotic plants in a sheltered situation, where they may remain till the middle or latter end of October; at which time they should be removed into the green-house, and placed where they may enjoy as much free air as possible in mild weather; for they only require to be protected from the frost, being pretty hardy with respect to cold, but they should not have too much moisture in winter. If these plants are planted in the full ground in the summer season, they will grow prodigiously rank and large; as they also will, if they are permitted to root into the ground through the holes at the bottom of the pots; therefore the pots should be frequently removed to prevent it, for when they grow too freely, their leaves will be very full of moisture; which, together with the weight of the fruit, which are always produced at the extremity of the branches, will weigh the branches upon the ground, and render the plants very unsightly. The plants of this kind commonly grow very straggling; therefore the more their roots are confined in the pots, the more close and stunted will be the heads of the plants; which is what they should always be kept to, in order to render them slightly. The flowers of this plant have no great beauty, but as the whole face of the

the plant is peculiar, it may be allowed a place in every collection of plants for the sake of variety, since it requires no great trouble to cultivate it.

These plants may also be propagated by seeds, which should be sown on a warm border of light fresh earth, where sometimes they will remain a whole year before the plants come up; therefore when they do not come up the first season, the borders should not be disturbed, but kept constantly clear from weeds; and the following spring, when the plants are come up about four inches high, they should be taken up and planted in pots, (and treated in the same manner as hath been directed for the cuttings;) for if they are suffered to grow in the border till they are large, they will not transplant so well, nor will they make so handsome plants.

The third sort hath large fleshy roots; the branches are weak, and trail upon the ground; these generally decay about Midsummer, and new shoots are produced late in autumn. The leaves of this come out in bunches; they are oval, plain, and not so thick and succulent as those of the other sorts; they are little more than an inch long, and half an inch broad. The flowers are produced from the wings of the leaves in February; these are like those of the second sort, and have long slender foot-stalks. This never produces any seeds in England; however the cuttings will grow, if they are planted early in the spring, so that the sort may be propagated with the same facility as either of the other kinds.

All these sorts require protection in winter; but if they are placed in an airy glass-case with Ficoides, and other hardy plants, where they may have a large share of free air in mild weather, and protected from the frost, they will thrive much better than when they are more tenderly treated.

TETRAGONOTHECA. Hort. Elth. 283. Lin. Gen. Plant. 875. Sun-flower, vulgò.

The CHARACTERS are,

The flower is composed of hermaphrodite and female florets, which are included in one large common empalement, cut into four plain, triangular, heart-shaped segments which spread open. The disk or middle of the flower is made up of hermaphrodite florets, which are funnel-shaped, and cut into five segments at the brim, which are reflexed; they have five short hair-like stamina, terminated by cylindrical summits, and a naked germen supporting a slender style, crowned by two reflexed stigmas. The germen afterward becomes one naked roundish seed. The female half florets which compose the ray or border of the flower, have their petals stretched out like a tongue on one side, and are cut at their points into three equal acute parts. These have no stamina, but a naked germen supporting a slender style with two twisted stigmas, and are succeeded by single naked seeds.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which includes the plants whose flowers are composed of hermaphrodite and female florets which are fruitful, and their summits are connected.

We have but one SPECIES of this genus, viz.

TETRAGONOTHECA (*Helianthoides*.) Lin. Sp. Plant. 903. *Tetragonotheca doronici maximi folio.* Hort. Elth. 378. *Dwarf Sun-flower, with a leaf like the greater Leopard's Bane.*

This plant is a native of Carolina, from whence the seeds were brought to Europe. The roots of this plant are perennial, but the stalks are annual, and perish in autumn on the approach of cold. The roots will abide through the winter in the full ground, if they are planted in a warm situation, so do not require any shelter, except in very severe winters; when, if they are covered over with rotten tan or Peas haulm, to keep out the frost, there will be no danger of their being killed.

About the latter end of April or the beginning of May, the roots will send forth new shoots, which are garnished with large, oblong, rough leaves, placed by pairs, closely embracing the stalks; these are a little sinuated on their edges, and are covered with small hairs. The stalks usually grow about two feet and a

half high in England, and branch out toward the top into several smaller stalks, each having one large yellow flower at their top, shaped like a Sun-flower; which, before it expands, is covered with the inflated empalement, which is four-cornered. The seeds of this plant rarely ripen in England, but when they are obtained from abroad, they should be sown in the full ground in the spring of the year; where sometimes they will remain a year before the plants come up, so that if they do not come up the same year, the ground should not be disturbed, but kept clean from weeds, and wait till the second year to see what plants will come up. When the plants appear they must be kept clean from weeds, and if the season should prove dry, they will require to be frequently watered. In autumn the plants should be transplanted into the places where they are to remain.

These plants will live three years in a proper soil and situation, but as it does not increase here, the best method is to procure good seeds from abroad annually.

TETRAPETALOUS FLOWER is one which is composed of only four single flower leaves, called petala.

TEUCRIUM. Lin. Gen. Plant. 625. Tourn. Inst. R. H. 207. tab. 93. [takes its name from king Teucer, who was the first amongst the ancients who brought this plant into use.] Tree Germander.

The CHARACTERS are,

The empalement of the flower is of one leaf, cut into five acute equal segments at the top, and is permanent. The flower is of the lip kind with one petal, having a short cylindrical tube a little incurved at the chaps. The upper lip is erect, and deeply cut into two acute segments. The lower lip spreads and is cut into three segments; the middle one is large and roundish, the two side ones are acute and erect. It has four awl-shaped stamina which are longer than the upper lip, and are prominent between the segments, terminated by small summits. It has a germen divided in four parts, supporting a slender style, crowned by two slender stigmas. The germen afterward turn to four roundish naked seeds which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two shorter stamina, and the seeds have no capsule.

The SPECIES are,

1. **TEUCRIUM** (*Flavum*) foliis cordatis obtusè ferratis, floralibus integerrimis concavis, caule fruticoso. Lin. Sp. Plant. 565. *Tree Germander with heart-shaped leaves which are bluntly sawed, those between the flowers concave and entire, and a shrubby stalk.* Teucium multis. J. B. *Common Tree Germander.*
2. **TEUCRIUM** (*Lucidum*) foliis ovatis acute inciso-ferratis glabris, floribus axillaribus geminis, caule erecto. Lin. Sp. Plant. 790. *Germander with oval smooth leaves which are acutely sawed, and two flowers proceeding from the side of the stalks, which are erect.* Chamædryas Alpina frutescens, folio splendente. Magnol. Hort. 52. *Shrubby Alpine Germander with a lucid leaf.*
3. **TEUCRIUM** (*Fruticans*) foliis integerrimis oblongo-ovatis petiolatis, supra glabris, subtus tomentosis pedunculis unifloris. Lin. Sp. Plant. 563. *Tree Germander with entire, oblong, oval leaves having foot-stalks, smooth and hoary underneath, and one flower on a foot-stalk.* Teucium fruticans Bæticum. Clus. Hist. 1. p. 348. *Spanish Tree Germander.*
4. **TEUCRIUM** (*Latifolium*) foliis integerrimis, rhombeis acutis, villosis, subtus tomentosis. Hort. Upsal. 195. *Tree Germander with entire leaves which are hairy, shaped like an acute rhombus, and woolly on their under side.* Teucium Hispanicum latiore folio. Tourn. Inst. R. H. 208. *Spanish Tree Germander with a broader leaf.*
5. **TEUCRIUM** (*Campanulatum*) foliis multifidis, floribus solitariis. Lin. Sp. 562. *Germander with many-pointed leaves, and flowers growing singly.* Teucium Hispanicum supinum humilius, verbenæ tenuifoliæ foliis. Jussieu. *Low, trailing, Spanish Germander, with leaves like those of the narrow-leaved Vervain.*

6. TEUCRIUM (*Botrys*) foliis multifidis, pedunculis axillaribus ternis. Lin. Sp. Plant. 562. *Germander with many-pointed leaves, and flowers growing on foot-stalks by threes.* Chamædryis foliis laciniatis. Lob. Observ. 209. *Germander with jagged leaves.*
7. TEUCRIUM (*Chamædryis*) foliis ovatis inciso-crenatis petiolatis, floribus subverticillatis. Hort. Cliff. 302. *Germander with oval leaves with crenated cuts, having foot-stalks, and flowers growing almost in whorls.* Chamædryis minor repens. C. B. P. 248. *Smaller creeping Germander.*
8. TEUCRIUM (*Nissolianum*) foliis trifidis quinquefidisque filiformibus floribus pedunculatis solitariis oppositis caule decumbente. Lin. Sp. 782. *Germander with trifid and quinquefid leaves, and flowers growing on solitary foot-stalks.* Chamædryis multiflora, tenuifolia Hispanica. Tourn. Inst. 205. *Spanish narrow-leaved Germander bearing many flowers.*
9. TEUCRIUM (*Massiliense*) foliis ovatis rugosis inciso-crenatis, incanis, caulibus erectis, racemis rectis. Lin. Sp. 789. *Teucrium with oval rough leaves, which are hoary, crenated, and erect stalks, and spikes of flowers.* Teucrium Creticum odoratum flore purpureo. H. R. Par. *Sweet-smelling Germander of Crete, with a purple flower.*
10. TEUCRIUM (*Scorodonia*) foliis cordatis ferratis petiolatis, racemis lateralibus secundis, caule erecto. Lin. Sp. Plant. 564. *Germander with heart-shaped sawed leaves having foot-stalks, many long bunches of flowers growing from the wings, and an upright stalk.* Scordium alterum five salvia agrestis. C. B. P. 247. *Another Scordium, or Wild Sage.*
11. TEUCRIUM (*Scordium*) foliis oblongis sessilibus dentato ferratis, floribus geminis lateralibus pedunculatis, caule diffuso. Lin. Sp. 790. *Teucrium with oblong, indented, sawed leaves sitting close to the stalks, flowers set by pairs on foot-stalks, proceeding from the sides of the stalks, which are diffused.* Scordium. C. B. P. 247.
12. TEUCRIUM (*Marum*) foliis integerrimis ovatis subtus tomentosis, utrinque acutis, racemis secundis villosis. Lin. Sp. Plant. 564. *Germander with oval entire leaves, which are hoary on their under side, pointed at both ends, and hairy bunches of flowers.* Marum Syriacum vulgò. Flor. Bat. 2. 84. *Syrian Mastick, or common Marum.*
13. TEUCRIUM (*Chamæpitys*) foliis trifidis linearibus integerrimis, floribus sessilibus lateralibus solitariis caule diffuso. Mater. Med. 287. *Germander with linear, trifid, entire leaves, and flowers sitting close, growing singly from the wings of the branches.* Chamæpitys lutea vulgaris, five folio trifido. C. B. P. 249. *Common yellow Ground Pine having a trifid leaf.*
14. TEUCRIUM (*Iva*) foliis tricuspidatis linearibus, floribus sessilibus. Lin. Sp. 787. *Germander with tricuspid linear leaves, and flowers sitting close to the wings of the stalk.* Chamæpitys moschata, foliis ferratis, an prima Dioscoridis? C. B. P. 249. *Musk Ground Pine with sawed leaves, and probably the first of Dioscorides.*
15. TEUCRIUM (*Moschatum*) foliis linearibus tomentosis integerrimis, floribus sessilibus. *Germander with linear, woolly, entire leaves, and flowers sitting close to the branches.* Chamæpitys moschata, foliis non ferratis. Allion. *Musk Ground Pine with leaves not sawed.*
16. TEUCRIUM (*Chamædrifolium*) foliis oblongo-ovatis obtusè dentatis, floribus solitariis alaribus pedunculatis, calycibus acutis. *Germander with oblong oval leaves, which are bluntly indented, and flowers placed singly at the wings of the stalks, having acute empalements.* Teucrium Americanum Chamædryos folio, flore albo. Houst. MSS. *American Teucrium, with a Germander leaf and white flower.*
17. TEUCRIUM (*Vesicarium*) foliis ovato-lanceolatis inæqualiter ferratis, racemis alaribus terminalibusque calycibus inflatis. *Germander with oval spear-shaped leaves which are unequally sawed, and long bunches of flowers springing from the wings, and terminating the stalks, and inflated empalements.* Chamædryis Americana, maxima, catarixæ folio, calice vesicario. Houst. MSS. *Greatest American Germander, with a Catmint leaf and a bladdered empalement.*
18. TEUCRIUM (*Canadense*) foliis ovato-lanceolatis fer-

ratis, caule erecto, racemo terminali, verticillis hexaphyllis. Lin. Sp. 789. *Germander with oval spear-shaped leaves, and an erect stalk terminated by a racemus of flowers.* Chamædryis Canadensis urticæ folio subtus incano. Tourn. Inst. 205. *Germander of Canada with a Nettle leaf, hoary on their under side.*

19. TEUCRIUM (*Virginicum*) foliis ovatis inæqualiter ferratis, racemis terminalibus. Flor. Virg. 64. *Germander with oval leaves unequally sawed, and a racemus of flowers terminating the stalks.*

The first sort grows naturally in the south of France, in Spain, and Italy; it rises with a shrubby stalk two feet high, sending out many ligneous branches, garnished with heart-shaped leaves, which are a little waved, bluntly sawed on their edges, a little more than an inch long, and three quarters broad near their base, of a lucid green on their upper side, but a little hoary on their under side, standing upon short foot-stalks. The upper part of the branches for six or eight inches in length are adorned with flowers, which come out from the wings of the stalk, two or three standing on each side at every joint; they are of a dirty white colour, and stand upon slender foot-stalks; under each of these whorls stand two smaller leaves, which are entire and concave. The flowers appear in July, and the seeds ripen in autumn.

This sort was formerly preserved in green-houses with great care, but of late years it has been planted out into the full ground, and is found hardy enough to endure the cold of our severest winters without shelter, provided it be planted on a dry soil.

This may be propagated by planting cuttings in the spring, on a bed of fresh light earth, observing to shade and water them until they have taken root; after which they will require no farther care; but to keep them clear from weeds until the following autumn, when they may be transplanted out into the places where they are to remain, being careful in removing them not to shake off all the earth from their roots, as also to water them if the season should prove dry, until they have taken fresh root; after which, the only care they require is to keep the ground clean about them, and to prune off such shoots as are ill situated, and the flowering branches when they decay, whereby their heads will appear more regular.

It may also be propagated by seeds, which generally are produced in plenty. If these are sown upon a bed of light earth in April, the plants will come up in six weeks after, and these may be transplanted in autumn, where they are designed to remain.

The second sort grows naturally on the Alps, but in the lower parts, where the cold is not very severe, and generally on moist ground; this hath a shrubby stalk like the former; it does not rise so high, but branches out more than that. The stalks are covered with short hairy down; the lower leaves are oval, crenated, and of a lucid green on their upper side, but a little hoary on their under; the leaves between the flowers are spear-shaped and entire; the spikes of flowers are much longer; the flowers are larger, and their colour more inclining to a yellow than those of the former. This flowers at the same time with the other, and may be propagated in the same way.

The third sort grows naturally in Spain and Sicily, near the borders of the sea; this has a shrubby branching stalk which rises six or eight feet high, covered with a hoary bark. The branches are garnished with small oval leaves placed opposite, sitting close to the branches; they are near one inch long, and half an inch broad, smooth on their upper side, of a lucid green, and their under sides are hoary. The flowers come out from the wings of the stalk at the upper part of the branches; they are single, one on each side at a joint standing upon short foot-stalks; their empalements are short and hoary. The middle segment of the lower lip is large, and indented at the point; the stamina are long-hooked, and supply the place of the upper lip; the flowers are blue, and come in succession great part of summer, and the plants frequently produce good seeds in England.

There is a variety of this with variegated leaves, which is preserved in some gardens.

The fourth sort is much like the third, but the leaves are broader, of a rhomboid form, and are more hairy and whiter on their under side; this will endure the cold of our ordinary winters, if planted on a dry soil and in a warm situation, but in severe hard frost it is sometimes destroyed; for which reason the plants are often preserved in pots, and removed into the greenhouse in winter. This is propagated by cuttings in the same manner as the former, and the plants require the same treatment.

The fifth sort grows naturally in Spain and Italy upon moist ground. The stalks of this are herbaceous, and trail upon the ground; they grow about a foot in length, are garnished with deep green leaves, cut into many points almost to the midrib; they are smooth, and stand opposite. The flowers come out on each side the stalks singly; they are white, and appear in July; these are each succeeded by four seeds, which ripen in September.

This plant is preserved in botanic gardens for variety; it is propagated by seeds, which may be sown in the spring in the place where the plants are to remain; and when they come up, will require no other culture but to thin them where they are too close, and keep them clean from weeds. These plants ripen their seeds the first year, but if they are in a warm situation they will live through the winter.

The sixth sort grows naturally in the south of France, in Italy and Germany, in the Corn fields; this is an annual plant, which perishes soon after the seeds are ripe. The stalks are four-cornered and hairy; they grow about a foot long, and are garnished at every joint by leaves placed opposite, which are hairy and cut almost to the midrib, and the segments are cut into three points. The flowers come out at the wings of the stalk in whorls, three standing together on each side upon short foot-stalks; they are white, and shaped like those of the other species; they appear in June and July, and the seeds ripen in August and September.

This is propagated by seeds in the same way as the last; but if the seeds of this are sown in autumn, or permitted to scatter when ripe, they will succeed better than if sown in the spring, and the plants will come earlier to flower.

The seventh sort grows naturally in the south of France, and in Germany; this has a creeping fibrous root, which spreads in the ground and multiplies greatly, sending out many four-cornered hairy stalks, which are eight or nine inches long; these send out a few short branches, which are garnished with oval leaves about an inch long, and three quarters broad, which are deeply crenated on their borders, and stand upon short foot-stalks; they are of a light green above, but hoary on their under side. The flowers grow from the wings of the stalks, toward the upper part, almost in whorls, standing chiefly to one side of the stalk; they are of a reddish colour, the lower lip turning upward. This plant flowers in June and July, and the seeds ripen in autumn.

It is a perennial plant, and propagates very fast by its creeping roots, and will thrive in almost any soil or situation: the best time to transplant it is in autumn. This was a few years since in great request as a specific for the gout, but is at present in little esteem.

The eighth sort grows naturally in Spain; this is a perennial plant, having some resemblance of the former, but the roots do not creep. The stalks are taller, and more erect; the leaves are narrower, pointed at both ends, and not so deeply indented; the indentures are sharper, and only toward their points; the stalks are garnished with flowers great part of their length, which come out in bunches at the wings of the leaves; they are longer than those of the former, and of a brighter red colour. This plant flowers about the same time with the former.

It may be propagated by parting of the roots in autumn, or by sowing of the seeds at the same season, which will more certainly succeed than those which are sown in the spring. It loves an open situation exposed to the sun, but will thrive in almost any soil which is not too moist.

The ninth sort grows naturally in the island of Crète, and also in Nice in Italy; this is a perennial plant with a low shrubby stalk, sending out many branches which are four-cornered and woolly; these are garnished with oval leaves about an inch long, and three quarters broad; they are woolly on both sides, and are bluntly crenated on their borders. The upper parts of the branches are adorned with purple flowers in whorls, having two small, oval, entire leaves under each whorl; the flowers are as large as those of the first sort, but their cups are very woolly, and their indentures end in sharp points. This flowers in July, and when the season proves warm and dry, the plants will produce good seeds in England.

This may be propagated either by seeds or cuttings in the same way as the two first sorts, but the plants should have a dry soil and a warm situation, otherwise they will not live through the winter in the open air in England.

The tenth sort is the common wild or Wood Sage, which grows naturally in woods and thickets in many parts of England, so is rarely admitted into gardens; this has a creeping perennial root, from which arise stiff, ligneous, four-cornered stalks a foot and a half high, garnished at each joint by two heart-shaped leaves placed opposite, which are slightly sawed on their edges, and stand upon foot-stalks. The upper part of the stalks have three or four long spikes of flowers, which incline to one side of the stalk; they are of an herbaceous white colour, and the stamina are terminated by purple summits. It flowers in July, and the seeds ripen in autumn. This plant will grow in any soil or situation, and was formerly used in medicine.

The eleventh sort is the common Water Germander, which grows naturally in the isle of Ely, and some other fenny parts of England; this has a small, stringy, fibrous, creeping root, which is perennial, from which arise many four-cornered, trailing, diffused stalks, which are garnished with oblong, hairy, and indented leaves, sitting close to the stalks. The flowers are produced at the wings of the stalks, two arising on each side at every joint; they are of a purple colour, and sit very close to the bottom of the leaves; these appear in July, but are seldom succeeded by seeds. The whole plant has an odour like that of Garlick. The herb is used in medicine.

This plant may be propagated by its creeping roots, or planting the young shoots in the spring, in the same manner as Mint, Penny-royal, &c. and should have a moist soil, otherwise it will not thrive in gardens.

The twelfth sort is the common or Syrian Marum, which grows naturally in Syria, and also in the kingdom of Valencia; this has a low shrubby stalk, sending out many slender ligneous branches, which in warm countries will rise three or four feet high, but in England it is rarely seen half that height. The stalks are very hoary, and are garnished with small oval leaves placed opposite at each joint; these are about the size of those of Thyme, and are pointed at both ends; they are green above, and hoary underneath; they have a piercing grateful scent, so quick as to cause sneezing. The flowers grow in loose whorled spikes at the end of the branches; they are very downy, and the flowers are of a bright red colour; they appear in July and August, but are not succeeded by seeds in England.

This plant is easily propagated by slips or cuttings, which, if planted during the summer months on a bed of light loamy earth, covering them down close either with bell or hand-glasses, and shading them from the sun, will put out roots very freely. When these have made good roots, they may be transplanted either

either into separate small pots, or on a warm border, at about six inches distance every way, observing to shade them from the sun, and supply them with water till they have taken new root; after which they will require no other care but to keep them clean from weeds. These plants will live through the winter in the open air, if they are planted in a dry soil and a warm situation, when the frosts are not very severe; but in very hard winters they are frequently killed, if they are not protected by mats or some other covering. There was about forty years ago a great number of these plants growing in the warm borders of the Royal Gardens at Kensington, which were clipped into conical forms, and were near three feet high, but now there are few plants of a large size to be found in the English gardens, because their branches are annually cut to keep them short.

The cats are very fond of this plant, and where there are but few of these plants will destroy them, unless they are protected from them; but, where there is a great number of the plants together, the cats seldom touch them.

The thirteenth sort is the common Ground Pine which is used in medicine; it grows naturally on chalky arable land in several parts of England; it is an annual plant, with a single ligneous root, which strikes deep into the ground, sending out a few slender fibres from the side, from which arise many weak trailing stalks which are very hairy; these are garnished with narrow leaves ending with three points, which are set by pairs, and cross over each other at every joint; they are hairy, and, when bruised, emit a strong resinous odour. The flowers sit close to the stalks at the wings of the leaves; there are two or three of them at each joint, of a bright yellow colour, and shaped like the other species; these appear in July, and the seeds ripen in September. If these are permitted to scatter, the plants will come up better than if sown, and require no other care but to thin them, and keep them clean from weeds.

This plant is greatly recommended for its virtues; there is scarce a better herb than this for opening obstructions; it is a strong diuretic, and an excellent remedy for the rheumatism.

The fourteenth sort grows naturally in the south of France, in Italy, and Spain; it is an annual plant, with a single ligneous root, sending out a few fibres. The stalks are about six inches high, and are closely garnished with very hairy narrow leaves which are indented toward their points. The flowers come out from the wings of the stalks to which they sit very close; they are large, of a bright purple colour, and appear in July; but unless the season proves favourable, they are not succeeded by seeds in England.

The fifteenth sort grows naturally about Nice in Italy, from whence it was sent me; this is also an annual plant, much like the former, but the leaves are narrower and entire. The whole plant is covered with white woolly hairs, and the flowers are smaller than those of the former.

Both these plants succeed best, if, when they perfect their seeds, they are permitted to scatter in the same manner as the thirteenth sort; or if the seeds are sown, it should be in autumn, for they rarely succeed when they are sown in the spring.

The sixteenth sort was discovered by the late Dr. Houstoun, growing naturally at La Vera Cruz; this is an annual plant, with an erect stalk a foot and a half high; it is four-cornered and smooth, garnished with smooth, oblong, oval leaves which are bluntly indented; they are about an inch and a half long, and three quarters of an inch broad, standing upon short foot-stalks. The flowers come out from the wings of the stalks, two of them arising at each joint, upon short slender foot-stalks; they are small and white, having short empalements, which are cut at the brim into five very acute points. The flowers appear in July, and are succeeded by seeds which ripen in autumn.

The seventeenth sort was discovered by the late Dr. Houstoun at the same place with the former; this is

also an annual plant, with a slender, upright, four-cornered stalk which rises three feet high, and divides into several smooth branches, which are garnished with oval spear-shaped leaves, three inches long and one broad, of a bright green on their upper side, but pale on their under; they are unequally sawed on their edges, and stand upon long foot-stalks. The flowers come out in long bunches from the wings of the stalk, and also at the top; they are pretty large, white, and have bladdered empalements; these appear late in July, and unless the season proves favourable, they will have no good seeds succeed them.

The sixteenth and seventeenth sorts are tender, so will not thrive in the open air in England; and unless the season proves warm, they will not perfect their seeds here. The seeds of these should be sown in small pots in autumn, which should be plunged into the tan-bed in the stove between the other pots, where they should remain till spring, and then they may be taken out, and plunged into a hot-bed, which will bring up the plants. When these are fit to remove, they should be each planted in a separate pot, and plunged into a hot-bed, and afterward treated in the same way as other tender plants which require constant shelter.

The eighteenth sort grows naturally in North America; this is a perennial plant, very like our Scorodonia or Wood Sage, but does not creep at the root as that does; the stalks are erect, and garnished with oval spear-shaped leaves which are white on their under side, and deeply sawed on their edges; the stalks are terminated by racemi of yellow flowers, and the whorls have six leaves.

This is a very hardy plant, so will thrive in the open air; it may be propagated by parting of the roots, or by sowing of the seeds, which is best if done in autumn.

The nineteenth sort grows naturally in Virginia; this is also a perennial plant, having oval leaves which are unequally sawed; the stalk is annual, and rises near a foot high, which is terminated by a long spike of red flowers, which appear in July and August, when the plants make a pretty appearance.

This is easily propagated by seeds, which are produced in plenty; if these are sown in the autumn on a bed of a light earth, they will succeed better than if sown in the spring.

THALICTRUM. Tourn. Inst. R. H. 270. tab. 143. Lin. Gen. Plant. 617. [This name is ancient, and written in a two-fold manner. In the manuscripts it is found *θάλιγθρον* and *θάλεχρον*, but has now obtained the name of *Thalictrum* among all the moderns, from *θάλλω*, to flourish, or look green. It was anciently used at weddings, and is called *πήγανον*, because some botanists have classed this plant with Rues.] Meadow Rue.

The CHARACTERS are,

The flower has no empalement, but has four or five roundish concave petals which fall off soon, and a great number of stamina, which are broad and compressed toward their tops, terminated by twin summits, which are oblong, with several very short styles sitting singly upon roundish germen, and crowned by thick stigmas. The germen afterward turn to so many keel-shaped capsules, collected in a head, each containing one oblong seed.

This genus of plants is ranged in the seventh section of Linnæus's thirteenth class, which contains those plants whose flowers have a great number of stamina and many styles.

The SPECIES are,

1. *THALICTRUM (Flavum)* caule folioso sulcato, paniculâ multiplici erectâ. Hort. Cliff. 226. *Meadow Rue with a furrowed leafy stalk, and many erect panicles of flowers.* *Thalictrum majus*, siliquâ anguloso aut striata. C. B. P. 336. *Greater Meadow Rue, with angular or channelled pods.*
2. *THALICTRUM (Speciosum)* caule anguloso, foliis linearibus bifidis trifidisque, paniculâ multiplici erectâ. *Meadow Rue with an angular stalk, narrow leaves ending in two or three points, and many erect panicles of flowers.* *Thalictrum majus*, siliquâ feminis striatâ, foliis

- liis rugosis trifidis. Mor. Umbel. 70. *Greater Meadow Rue with streaked seed-vessels, and rough trifid leaves.*
3. THALICTRUM (*Aquilegifolium*) fructibus pendulis triangularibus rectis, caule tereti. Lin. Sp. Plant. 547. *Meadow Rue with a pendulous triangular fruit, and a taper stalk.* Thalictrum majus staminibus florum purpurascentibus. C. B. P. 337. *Greater Meadow Rue with purple stamina to the flowers, commonly called feathered Columbine.*
 4. THALICTRUM (*Lucidum*) caule folioso fulcato, foliis linearibus carnosiss. Dalib. Paris. 162. *Meadow Rue with a furrowed leafy stalk, and linear fleshy leaves.* Thalictrum pratense minus alterum, Parisiensium, foliis crassioribus lucidis. H. R. Par. *Another smaller Meadow Rue of Paris, with thicker shining leaves.*
 5. THALICTRUM (*Canadense*) floribus pentapetalis, radice fibrosâ. Flor. Leyd. Prod. 486. *Meadow Rue with flowers having five petals, and a fibrous root.* Thalictrum Canadense. Cornut. Canad. 186. *Meadow Rue of Canada.*
 6. THALICTRUM (*Tuberosum*) floribus pentapetalis, radice tuberosâ. Hort. Cliff. 227. *Meadow Rue with flowers having five petals, and a tuberous root.* Thalictrum minus asphodeli radice, magno flore. Tourn. Inst. 271. *Smaller Meadow Rue with an Asphodel root, and a large flower.*
 7. THALICTRUM (*Minus*) foliis sexpartitis, floribus cernuis. Lin. Sp. Plant. 546. *Meadow Rue with leaves cut into six segments, and nodding flowers.* Thalictrum minus. C. B. P. 337. *Smaller Meadow Rue.*
 8. THALICTRUM (*Fetidum*) caule paniculato ramosissimo folioso. Lin. Sp. Plant. 545. *Meadow Rue with a very branching, paniculated, leafy stalk.* Thalictrum minimum foetidissimum. C. B. P. 337. *The least stinking Meadow Rue.*
 9. THALICTRUM (*Dioicum*) floribus diocis. Lin. Sp. Plant. 545. *Meadow Rue with male and female flowers on different plants.* Thalictrum pratense minus. Park. Theat. 265. *Small American Meadow Rue.*
 10. THALICTRUM (*Angustifolium*) foliolis lanceolato-linearibus integerrimis. Hort. Cliff. 226. *Meadow Rue with spear-shaped linear leaves which are entire.* Thalictrum pratense, angustissimo folio. C. B. P. 337. *The narrowest leaved Meadow Rue.*
 11. THALICTRUM (*Alpinum*) caule simplicissimo subnudo, racemo simplici terminali. Hort. Cliff. 227. *Meadow Rue with a single stalk which is almost naked, and terminated by a single bunch of flowers.* Thalictrum montanum minimum præcox, foliis splendentibus. Mor. Hist. p. 325. *The least Meadow Rue with shining leaves.*

The first sort grows naturally by the side of rivers and in moist meadows in many parts of England. This has a yellow creeping root, from which arise several furrowed stalks five or six feet high, garnished at each joint with leaves composed of many lobes, which differ in their form and size; some are spear-shaped and entire, others are obtuse, and cut into three points; they are of a deep green colour on their upper side, but pale on their under. The flowers are of an herbaceous white colour, and formed into many panicles, standing erect on the top of the stalks. These appear in July, and are succeeded by short triangular capsules containing one oblong seed.

The second sort grows naturally in the meadows about Montpellier. The root of this is like the former; the stalks are angular, and rise five feet high; they are better furnished with leaves, whose lobes are very narrow, some of them ending with two, and others with three points, of a bright green colour. The flowers are yellow, and are formed into many panicles which terminate the stalks. This sort flowers about the same time with the former.

The third sort grows naturally upon the Alps; of this there are two varieties, one with a green stalk and white stamina, the other has purple stalks and stamina. These two are propagated in gardens, by the title of feathered Columbine; this hath a thick fibrous root; the stalks are taper, and rise three feet high; the leaves are like those of the Columbine.

The flowers grow in large panicles at the top of the stalk. It flowers in June, and the seeds, which are in triangular capsules, ripen in August.

The fourth sort grows naturally in the meadows about Paris; this hath upright channelled stalks which rise five or six feet high, garnished at each joint with winged leaves, composed of many linear fleshy lobes, which are for the most part entire, ending in acute points. The flowers are of a yellowish white colour; they appear in July, and are succeeded by small angular capsules with one small oblong seed in each, which ripens in August.

The fifth sort grows naturally in North America; this has a fibrous root of a dark colour. The stalks are smooth, of a purple colour, and rise three or four feet high, branching toward the top. The leaves are like those of Columbine, of a grayish colour, and smooth. The flowers are produced in large panicles at the top of the stalks; they are larger than those of the former sorts, and have five white petals which soon fall off, and a great number of white stamina with yellow summits. This flowers in June, and the seeds ripen in August.

The sixth sort grows naturally in Spain; this has knobbed roots; the leaves are small, obtuse, and indented in three parts at their points; they are of a grayish colour and smooth. The stalks rise a foot and a half high, naked almost to the top, where they divide into two or three small ones, under which is situated one leaf. Each division of the stalk is terminated by a small bunch of pretty large flowers, having five white petals. The flowers are almost disposed in form of an umbel. They appear in June, and are succeeded by small angular capsules, containing one oblong seed in each, which ripen in August.

The seventh sort grows naturally in some parts of Cambridgeshire; this has a creeping fibrous root. The stalks rise about a foot high, and are garnished with winged leaves composed of many obtuse short lobes, which are cut into six segments. The stalks branch out wide; the flowers grow in loose panicles; they are small and nodding. The stamina are of an herbaceous white, and the summits are yellowish. It flowers in June.

The eighth sort grows naturally in the south of France; this hath a very branching stalk which rises about six or seven inches high, garnished with winged leaves, which are downy, composed of a great number of small lobes which are bluntly indented, and have a foetid scent. The flowers grow in loose panicles; they are small, of an herbaceous white colour, with yellowish stamina. This flowers in June.

The ninth sort grows naturally in North America. The root of this is fibrous; the stalks rise near a foot high, and are almost naked at the top, where they have one leaf, composed of many small lobes of a grayish colour, indented at their points. The flowers are produced in small bunches at the top of the stalks; they are male and female in different plants. These appear in June.

The tenth sort grows naturally in Italy and some parts of Germany; this hath a perennial root. The stalks rise from two to three feet high; the leaves are winged like those of the other sort, their lobes are narrow and entire. The flowers are small, and are collected in panicles at the top of the stalks, and are of an herbaceous white colour.

The eleventh sort grows naturally on the Alps; this hath a fibrous creeping root; the leaves are small, blunt, and of a grayish colour. The stalks rise about six inches high, and are almost naked; they are terminated by a single loose spike of flowers, each having four petals. This flowers the latter end of April or the beginning of May.

These plants are generally propagated by parting their roots. The best time for this work is in September, when their leaves begin to decay, that they may take fresh root before the frost comes on to prevent them; they should also be planted in a fresh light soil, and have a shady situation, in which they will thrive exceedingly, though they may be planted in almost

most any soil or situation, provided it be not too hot and dry; but most of them creep so much under ground, as to become very troublesome in a garden, for which reason there are but few of the sorts admitted into gardens. The third, fifth, and sixth sorts are frequently cultivated in the gardens. The roots of these do not creep like the others, and their flowers have some beauty to recommend them, but the others are only kept in botanic gardens for the sake of variety; therefore when they are admitted, their roots should be confined in pots, otherwise they cannot be kept within bounds.

THAPSIA. Tourn. Inst. R. H. 321. tab. 171. Lin. Gen. Plant. 323. [so called of the island of Thapsus, where it grew in plenty.] The deadly Carrot, or scorching Fennel.

The CHARACTERS are,

It has an umbellated flower; the general umbel is large, and composed of about twenty rays which are nearly equal; these have no involucri; the general umbel is uniform. The flowers have five spear-shaped incurved petals, and five hair-like stamina the length of the petals, terminated by single summits. It has an oblong germen situated under the flower, supporting two short styles crowned by obtuse stigmas. The germen afterward becomes an oblong fruit, girt with a longitudinal membrane dividing into two parts, each containing one oblong seed, pointed at both ends, having plain borders on both sides.

This genus of plants is ranged in the second section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. **THAPSIA** (*Villosa*) foliolis dentatis villosis basi coadunatis. Hort. Cliff. 105. *Scorching Carrot with indented hairy lobes, which are joined at their base. Thapsia latifolia villosa. C. B. P. 148. Broad-leaved, hairy, scorching Fennel.*
2. **THAPSIA** (*Maxima*) foliis pinnatis, foliolis latissimis pinnatifidis subtus villosis petiolis decurrentibus. *Scorching Carrot with winged leaves, having very broad wing-pointed lobes, which are hairy on their under side, and running foot-stalks. Thapsia maxima, latissimo folio. C. B. P. 148. The greatest scorching Fennel with a very broad leaf.*
3. **THAPSIA** (*Fœtida*) foliolis multifidis basi angustatis. Hort. Cliff. 105. *Scorching Carrot with many-pointed lobes, which are narrowed at their base. Thapsia Carotæ folio. I. B. 3. p. 187. Scorching Fennel with a Carrot leaf.*
4. **THAPSIA** (*Apulia*) foliis digitatis, foliolis bipinnatis multifidis setaceis. Hort. Cliff. 106. *Scorching Carrot with many-pointed, hand-shaped, bristly lobes. Thapsia tenuiore folio Apulia. Tourn. Inst. 322. Narrow-leaved scorching Fennel of Apulia.*
5. **THAPSIA** (*Trifoliata*) foliis ternatis ovatis. Lin. Sp. Plant. 262. *Scorching Carrot with oval trifoliate leaves. Sium folio infimo cordato, caulinis ternatis, omnibus crenatis. Flor. Virg. 31. Water Parsnep with heart-shaped leaves, those on the stalks trifoliate, and all of them crenated.*
6. **THAPSIA** (*Altissima*) foliis decompositis, lobis maximis lucidis, umbella maxima. *The tallest scorching Carrot with compounded leaves, having very large lucid lobes, and great umbels. Thapsia montana, omnium maxima, foliis lobatis. Hort. Pis. 164. The largest mountain scorching Carrot with broad lobes.*

The first sort grows naturally in Spain, Portugal, and the south of France; this hath a thick fleshy root in shape of a Carrot, which has an outward blackish skin; the inside is white, bitter, and very acrid, with a little aromatic taste. The leaves are winged; the lobes are thick, hairy, and indented; they are regularly cut into opposite segments like other winged leaves. The stalk is spungy, and rises about two feet high, dividing upward into two or three small branches, each being terminated by a large umbel of yellow flowers. These appear in June, and are succeeded by large, flat, bordered seeds which ripen in August.

The second sort grows naturally in Spain, and all over Old Castile, quite to the Pyrenean mountains. The

root of this sort is large, thick, and of a dark colour without. The leaves are very thick, and hairy on their under side; they spread circularly on the ground, and are divided into broad hairy lobes. The stalks rise four or five feet high; they are large, jointed, and full of pith, having one leaf at each joint, shaped like those at the bottom, but are smaller as they are nearer the top. The stalk is terminated by a large umbel of yellow flowers which appear the latter end of June, and the seeds ripen about two months after.

The third sort grows naturally in Italy and Spain. The leaves of this sort are cut into many narrow segments, almost as small as those of the garden Carrot, but are rough and hairy; their segments are always opposite, and are narrower at their base than their points. The stalks rise about two feet high, and are terminated by umbels of small yellow flowers which appear in July; these are succeeded by flat bordered seeds which ripen the beginning of September.

The fourth sort grows naturally in Apulia. The root of this is about the thickness of a man's thumb; the bark is yellow and wrinkled, the inside white, and abounds with an acrid milky juice; the leaves are finely divided like those of Fennel, they are hairy, and sit close to the root. The stalk rises from two to three feet high; it is naked, and branches into two or three stalks, each being terminated by a small umbel of flowers, which are large, yellow, and appear in July: these are succeeded by flat seeds, having cartilaginous borders, which ripen in September.

The fifth sort grows naturally in North America. The seeds were sent me by Dr. Bensel from Philadelphia. This hath a slender tap root, which is shaped like those of Parsley; the leaves at the bottom are heart-shaped. The stalk is single and does not branch; it rises near two feet high, is of a purple colour, and slender; this is garnished at each joint with one trifoliate leaf, whose lobes are oval and crenated. The stalk is terminated by a small umbel of purple flowers which appear in July, and are succeeded by compressed channelled seeds which ripen in September. Dr. Gronovius thinks this plant very like that which is figured by Kempfer, by the title of Nindzi.

The sixth sort grows naturally in Apulia: this hath a large taper root; the leaves spread circularly near the ground; these are divided into several lobes, which are divided into many very large lucid lobes, standing alternately on short foot-stalks: the stalk rises near eight feet high, and is terminated by an umbel of yellow flowers, which appear in July, and are succeeded by bordered compressed seeds which ripen in September.

These plants are all of them propagated by seeds, which should be sown in autumn; for if they are kept out of the ground till spring, they often miscarry, or if they grow, they commonly lie a whole year in the ground before the plants come up; whereas those seeds which are sown in autumn, generally grow the following spring. These should be sown in drills, in the place where they are designed to remain. The drills should be at least three feet and a half asunder, because the plants spread their leaves very wide. When the plants come up in the spring, they must be carefully cleared from weeds; and where they are too close together, some of them should be drawn out to give room for the others to grow, but at this time they need not be left more than two or three inches apart; for the first year when the plants arise from seeds, they make but slow progress, except the sixth sort, which will require more room; so the autumn following the remaining part of the plants may be taken up, leaving those which are designed to remain about eighteen inches asunder; and those plants which are taken up may be transplanted into another bed, if they are wanted. After the first year these plants will require no farther care, but to keep them clear from weeds; and every spring, just before the plants begin to push out new leaves, the ground should be carefully dug between the plants to loosen it, but the roots must not be injured, lest it should cause

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cause them to decay. The plants being thus managed, will continue several years, and produce flowers and seeds annually, from which new plants may be raised. They delight in a soft loamy soil, and if they are exposed only to the morning sun, they will thrive better than if they have a warmer situation, for they endure the cold of our winters very well. The roots of the third sort were formerly used in medicine, but are now never ordered, being supposed to have a poisonous quality. Boerhaave says it has much the same qualities as Euphorbium, it burns the bowels and produces a diarrhœa.

THELIGONUM. Lin. Gen. Plant. 947. Cynocrambe. Tourn. Cor. 52. tab. 485. Dogs Cabbage.

The CHARACTERS are,

It has male and female flowers on the same plant. The male flowers have a turbinated empalement of one leaf, cut into two segments which turn backward. It has no petal, but several erect stamina the length of the empalement, terminated by single summits. The female flowers have a small bifid empalement of one leaf, which is permanent. It has no petals, but has a globular germen, supporting a short style crowned by an obtuse stigma. The germen afterward becomes a thick globular capsule with one cell, inclosing one globular seed.

This genus of plants is ranged in the eighth section of Linnæus's twenty-first class, which includes the plants whose flowers have male and female flowers on the same plant, and the flowers have many stamina.

We have but one SPECIES of this genus, viz.

THELIGONUM (Cynocrambe.) Sauv. Monsp. 129. Cynocrambe Dioscoridis. C. B. P. 122. Dogs Cabbage of Dioscorides.

This plant grows naturally in the south of France, in Italy, and Tartary. It is an annual plant, which decays as soon as the seeds are ripe. The stalks trail on the ground like those of Chickweed; they grow about a foot long; their joints are pretty close; these are garnished with oval acute-pointed leaves, standing on pretty long foot-stalks which are bordered. At each joint is placed one of these leaves, and from the same point come out several smaller leaves of the same shape on shorter foot-stalks. The flowers are produced from the wings of the stalk in clusters, sitting very close; they are small, of an herbaceous white colour, so make no great appearance. The male and female flowers grow from the same joint. The female flowers are succeeded by a single roundish seed, which ripens in autumn.

It is preserved in botanic gardens for the sake of variety. The seeds of this must be sown in autumn, in the place where the plants are to remain; for when they are sown in the spring, the plants rarely come up the same year. They require no other culture but to keep them clean from weeds, and thin them where they are too close.

THEOBROMA. Lin. Gen. Plant. 806. Guazuma. Plum. Nov. Gen. 36. tab. 18. Bastard Cedar.

The CHARACTERS are,

The empalement of the flower is composed of three oval concave leaves which are reflexed. The flower has five oval petals which spread open, and are hollowed like a spoon; from the top of each petal comes out a bifid bristly ligula, divided like two horns. It has a great number of short stamina joined in five bodies, and are the length of the petals, which are terminated by roundish summits, and a roundish germen supporting a single style the length of the petals, crowned by a single stigma. The germen afterward turns to a roundish fruit with five angles, opening in five cells, each containing several seeds.

This genus of plants is ranged in the first section of Linnæus's eighteenth class, which includes those plants which have many stamina joined in five bodies.

We have but one SPECIES of this genus, viz.

THEOBROMA (Guazuma) foliis serratis. Hort. Cliff. 379. Theobroma with sawed leaves. Guazuma arbor ulmi-folia, fructu ex purpura nigro. Plum. Nov. Gen. 36. Tree Guazuma with an Elm leaf, and a black purple fruit. This grows naturally in most of the islands in the West-Indies, where it rises to the height of forty or

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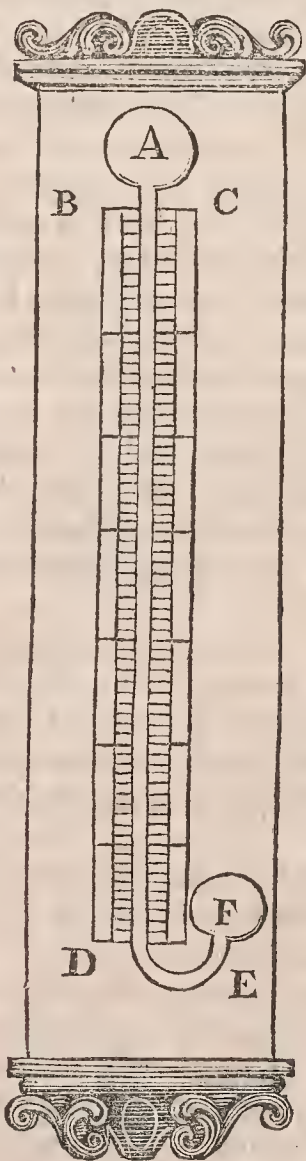
fifty feet, having a trunk as large as a middle-sized man's body, covered with a dark brown furrowed bark, sending out many branches toward the top, which spread out wide on every hand, and are garnished with oblong heart-shaped leaves placed alternate, which are near four inches long, and two broad near their base, ending in acute points, of a bright green on their upper side, and pale on their under, sawed on their edges, with a strong midrib, and several transverse veins, and stand upon short foot-stalks. The flowers come out in bunches from the wings of the leaves; they are small and of a yellow colour, having five concave petals which spread open circularly, with a great number of stamina, which at their base are joined in five bodies, terminated by roundish summits. In the center is situated a roundish germen, supporting a slender style the length of the stamina, crowned by a single stigma. The germen afterward turns to a roundish warted fruit having five obtuse angles, and five cells which contain several irregular seeds.

The wood of this tree is white and ductile, so is frequently cut into staves for casks. The fruit and leaves are good fodder for cattle, therefore when the planters clear the land from wood, they leave the trees of this sort standing for food for their cattle, which is of great use in dry seasons, when the common fodder is scarce. There are some plants of this sort preserved in the gardens of some curious persons; it is propagated by seeds, which must be procured as fresh as possible from the countries where the plants grow naturally. These should be sown upon a good hot-bed in the spring, and when the plants are fit to remove, they should be each planted in a separate small pot, and plunged into a hot-bed of tanners bark, observing to shade them from the sun till they have taken new root; then they should be treated in the same way as the Coffee-tree, keeping them always in the tan-bed in the stove.

THERMOMETER, [Θερμόμετρον, of θερμός, heat, and μέτρον, to measure.] An instrument shewing, or rather measuring, the increase and decrease of the heat, and cold of the air.

Of which there are various kinds; the constructions, defects, theories, &c. whereof are as follow.

The construction of a Thermometer, depending on the rarefaction of the air.



In the tube CF, to which is fastened a glass ball A, is put a quantity of common water, mixed with aqua regia, to prevent its freezing; and the mixture tinged with a solution of vitriol, to give it a greenness. In filling the tube, care is taken that there be so much air left in the ball and tube, as that when at its greatest condensation in the middle of winter, it may just fill the ball; and yet in its greatest rarefaction in summer, may not drive all the liquor out of the tube. To the other extreme of the tube is fastened another glass ball EF, open to the air at F. On each side the tube is applied the scale BD, divided into any number of equal parts.

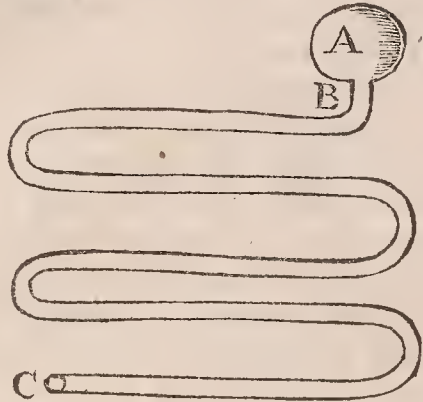
Now as the ambient air becomes warmer, the air in the ball and the top of the tube expanding, would drive the liquor into the lower ball, and consequently its surface will descend; on the contrary, as the ambient air grows colder, that in the ball becoming condensed, the liquor will ascend.

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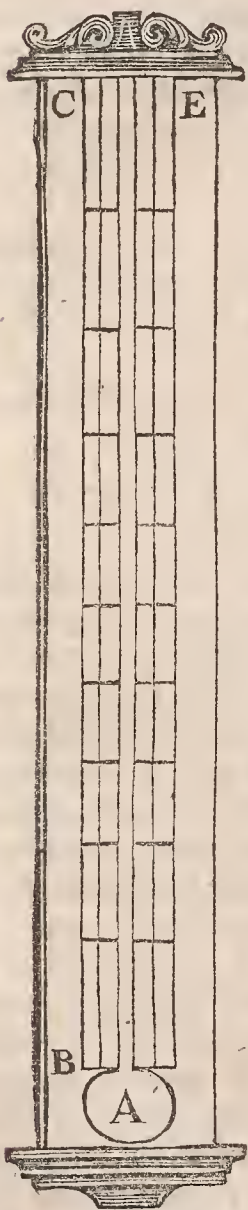
The construction of the Mercurial Thermometer.

In the manner, and with the same caution as before, put a little quantity of mercury, not exceeding the bigness of a Pea, into a tube B C, thus bent with wreaths; that taking up the less height, it may be the more manageable, and less liable to harm: divide this tube into any number of equal parts, to serve for a scale.



Here the approaches of the mercury towards the ball A, will shew the increases of the degree of heat. The reason is the same as in the former.

But both these instruments are defective in this, that they are liable to be acted on by a double cause; for not only a decrease of heat, but also an increase of weight of the atmosphere, will make the liquor rise in the one, and the mercury in the other; and on the contrary, either an increase of heat, or decrease of weight of the atmosphere, will make it descend.



There being some inconveniencies attending the Thermometers just described, another has been attempted, that should measure heat and cold by the rarefaction and condensation of spirits of wine; tho' that be vastly less than that of air, and consequently the alterations in the air likely to be much less sensible.

The structure of this Thermometer is this: on some little pieces of Turmerick is poured a quantity of spirit of wine, which hereby receives a red tincture; this being done, the spirit of wine is filtrated through a brown paper, that the coarser particles of the root may be separated therefrom: with the spirit thus tinged and prepared, they fill a glass ball with a tube, and that all the spirit may not descend in winter into the ball, it is convenient to put the ball into a lump of snow mixed with salt; or, if the instrument be to be made in summer, into spring water, impregnated with saltpetre, that the condensed spirit may shew how far it will retire in the extreme cold.

If it be still at too great a distance from the ball, part of it is to be taken out; and that the tube may not be much longer than needs, it is convenient to immerge the ball, filled with its spirit, in boiling water, and to mark the farthest point to which the spirit then rises.

At this point the tube is to be hermetically sealed by the flame of a lamp; and at the sides is to be added a scale, as in the former Thermometers.

Now the spirit of wine rarefying and condensing very considerably, as the heat of the ambient air increases, the spirit will dilate, and consequently will ascend in the tube; and as the heat decreases, the spirit will descend, and the degree or quantity of ascent and descent will be seen in the scale.

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Yet, as the ratio of yesterday's heat to to-day's, is not hereby discovered, this instrument is not strictly a Thermometer, any more than the former.

Here it is to be observed;

1. That as the natural gravity of the liquor makes it tend downward, so it resists its ascent out of the ball into the tube, and that the more as it rises higher, for which reason it were best to have the tube horizontal.

2. Since there must of necessity be some air left in the void part of the tube over the liquor, that air, by its elasticity, will tend downward, and of consequence will resist the rise of the liquor, and be compressed by it as it does rise; its elasticity therefore is thus increased.

3. Since it is found by experience, that a less degree of heat is communicated more easily to the spirit of wine in the ball than a greater, the rarefactions of the spirit of wine are not proportionable to their producing causes; especially a greater degree of heat finds more liquor in the tube than a less does; to which, notwithstanding, the heat may be more easily communicated than to that stagnating in the ball.

On these accounts, this last Thermometer, called the Florentine Thermometer, because contrived by the Academists del Cimento, though it is that which is in common use, is far from being an accurate measure of heat, &c. To which may be added, what Dr. Halley observes in the Philosophical Transactions, that he has learned from those that have kept spirit of wine long, that it loses part of its expansive force in course of time.

Various authors have proposed various methods for finding a fixed point or degree of heat and cold, from which to account for the other degrees, and adjust the scale; so that observations made at the same or different times, in different places, may be compared together.

Some note the place the liquor is at in winter, when water begins to freeze; and again that in summer, when butter placed near the ball of the Thermometers, melts. The intermediate space they divide into two equal parts; the middle point whereof answers in their graduation to temperate heat; and each moiety they subdivide into ten degrees, adding four other equal degrees on each of the two extremes.

But this method supposes the same degree of heat and cold to answer to the freezing of all water, and the melting of all butter, as also that all Thermometers receive the same impressions from the same degree of heat; all which are contrary to experience.

Others advise, that the ball of the Thermometer be put into any quantity of snow and salt, and the point the liquor is at to be noted; and that thence the Thermometer be removed into a deep cave or cellar, whither no external air reaches; so that the liquor receiving the action of the temperate heat, may shew the degree of temperate heat; and lastly, they divide the intermediate space into fifteen or more equal parts which they continue beyond each extreme; but this method is liable to the like inconvenience with the former.

Dr. Halley assumes, that for a fixed degree of heat, where spirits of wine begin to boil; but there is reason to suspect this too of being precarious; though, after him, Mr. Amontons retains the degree of heat, answering to boiling water, for the graduating his mercurial Thermometer: but as the different specific gravities of water argue a different mass or texture, it is highly probable, that the heat of all boiling waters is not the same, so that the point is yet undetermined.

THERMOSCOPE, [of θερμε, heat, and σκοπέω, I view.] An instrument designed to shew the changes happening in the air, with respect to heat and cold. The name of Thermoscope is indifferently used with that of thermometer; however, there is some difference in the literal import of the words; the first signifying an instrument that shews or exhibits the changes

changes of heat, &c. to the eye; and the latter an instrument that measures those changes; on which foundation the thermometer should be a more accurate Thermoscope.

This difference the excellent Wolfius taking hold of, describes all the thermometers in use as Thermoscopes; shewing, that none of them do properly measure the changes of heat, &c. and that none of them do more than indicate the same.

Though their different heights, yesterday and to-day, shew a difference of heat; yet since they do not discover the ratio of yesterday's heat to to-day's, they are not strictly thermometers.

The Acta Erud. Lips. proposes a method of graduating the common thermometers so, as that the unequal divisions thereof shall correspond to equal degrees of heat, whereby the ratio of to-day's heat to yesterday's will be measured, and consequently the Thermoscope improved into a thermometer.

The method is thus:

Take a slender tube about four palms long, with a ball fastened to the same; pour into it spirit of wine, enough just to fill the ball when surrounded with ice, and not a drop over; in this state seal the orifice of the tube hermetically, and provide six vessels, each capable of containing a pound of water, and somewhat over; and in the first pour eleven ounces of warm water, into the second ten ounces, into the third nine, &c.

This done, immerse the thermometer into the first vessel, and pour into it one ounce of hot water, observing how high the spirit rises in the tube, and noting the point with an unit, then remove the thermometer into the second vessel, into which are poured two ounces of hot water, and note the place the spirit rises to with two; by thus proceeding till the whole pound of water is spent, the instrument will be found to be divided into twelve parts, denoting so many terms or degrees of heat; so that at two, the heat is double to that of one; at three triple, &c.

But Wolfius shews, that though this method is plausible, yet it is deceitful, and built upon false suppositions; for it takes for granted, we have one degree of heat, by adding one ounce of hot to eleven of cold water, two degrees by adding two ounces to ten, &c. It supposes that a single degree of heat acts on the spirit in the ball of a single force, a double with a double force, &c.

Lastly, it supposes, that if the effect be produced in the thermometer, by the heat of the ambient air, which is here produced by the hot water, the air has the same degree of heat with the water.

But none of these suppositions are true; for as to the first, allowing the heat of the hot water equally distributed through the cold, one degree of heat will be distributed through eleven parts, two through ten, three through nine, &c. taking therefore equal bulks of water, e. g. a twelfth part of each, the heat will not be double in the one, triple in another, &c.

The first supposition is therefore erroneous, and so is the second; neither is the heat of the hot water equally diffused through the cold; nor does the heat of the hot water act uniformly on the spirit of wine; i. e. not with the same force all the time of its action. For the third supposition; the heat of the ambient air acts not only on the spirit of wine on the ball, but also on that in the tube; and therefore this, as well as that, should be changed.

Dr. Hook, in order to adjust the gradations of a thermometer with the greater accuracy, hath contrived and described an instrument for that purpose, in his Micrographia, p. 38.

The way of filling Thermoscopes, or such other small glass tubes, with spirit of wine or water.

Take the ball of the glass, and then warm it gently between your hands; then heat it very well (though gently) before a good fire, turning it round, that it may be equally warm; for, without this caution

there will be danger of its breaking: then applying the ball to the flame of a lamp or candle, burning it about in it, heat it as hot as you can, without melting the glass; and then speedily immersing the open end of the pipe into the vessel of liquor that you intend to fill it withal, the liquor will rise into it, and fill it near full.

The reason of which ascent of the liquor is, that the air within the ball and the tubes being expelled in great measure by the heat, or at least rarefied there to a very great degree, the immersed open end of the tube keeps off the pressure of the circumambient atmosphere on that part of the liquor that the end of the tube covers: but the atmosphere presses on all other parts of the liquor in the open vessel; and, consequently, there being none, or a very small quantity of air within the tube to hinder it, forces it by its weight up into the tube, till it gain an equilibrium with the pressure or weight of the air without.

If the tube cannot be filled full enough by this method, the rest may be supplied by a small glass funnel; the shank of which must be drawn out exceeding slender, and inserted into the orifice of the tube; and then, by blowing, you may force by your breath the spirit of wine into the tube, so as to fill it quite, or to what degree you please.

Dr. Hook, in his Micrographia, hath an engine for graduating his thermometers, to make them true standards of heat and cold.

The thermometers or Thermoscopes are instruments of very great use to gardeners in the management of stoves. They shew by inspection the present condition of the air, and whether it be hot or cold; which day in summer is the hottest, and in the winter which is the coldest, or any part of the day; and from thence many useful experiments have and may be made; viz. how much one spring exceeds another in coldness; which baths are the hottest or coldest; and, if being held in the hand of a person in a fever, or otherwise applied, will nicely shew the abatement or increase of a fever.

The common thermometer which is used for hot-houses, has a long tube of about two feet in length, and is about the eighth part of an inch diameter; and in this it is remarked, that the air is cold for the plants when the spirit rises to fifteen inches; that it is temperate at sixteen inches and a half; that it is warm when it rises to eighteen inches; and this is the standard for Pine-apple heat. It is marked for hot air at twenty inches, and sultry hot at twenty-one and a half; but in the common thermometers, these degrees are differently marked; this temperate air is about our warm, this warm air our hot, and our hot air is about the same as the sultry.

These thermometers are marked with some of the names of the most remarkable plants which are preserved in the hot-houses; but as the number of these plants has been greatly increased in England of late years, I have directed some thermometers to be made with a scale divided into degrees, and with three different points of heat marked in classes, which correspond with these thermometers; and under each class I have drawn up lists of the several plants, ranged according to the degrees of heat in which they are found to succeed; whereby the culture of them is made easy to persons of small skill.

By this means every gardener may know when it is proper to apply his heat in its full force, and what degree of heat ought to be used for the welfare of any plant from any part of the world.

Mr. Patrick has fixed his thermometer to a scale of ninety degrees, which are numbered from the top downwards, and also a moveable index fitted to it.

The design of this is to shew how the heat or cold is changed, from the time it was last looked upon, according to the different degrees of heat and cold in all latitudes; as by the trial of two thermometers that have been regulated abroad, the one by Dr. Halley, in his late southern voyage, and the other by Capt. Johnson, in his voyage to Greenland. The

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first has a degree of heat under the equinoctial line, and the other a degree of cold in 88 degrees north latitude.

These instruments, the barometer, hygrometer, and thermometer or Thermoscope, discover the alterations of the air, as to wet or dry, especially if it be accompanied with a hygrometer; and the thermometer shews the condition of the air, as to heat or cold.

The method prescribed to be used in keeping the accounts or observations made on the alterations of these instruments, is that which was used by the Hon. Samuel Molyneux, Esq;

There must be a book for the remarks in all the twelve months of the year, which are to be made six times every day. At these times you must observe,

1. How the quicksilver rises or falls in the barometer.
2. What is the alteration of the hygrometer.
3. How the spirits in the thermometer rise or fall.
4. From what point of the compass the wind blows; and also with what strength, according to the nearest guesses that can be made.
5. Whether it rains, snows, hails, &c. and in what quantity.

Every leaf of the book is to be divided into several columns; the first for the day of the month and the week, the second for the number of inches and parts of an inch in the tube of the barometer, where the quicksilver stands at the time when the observation is made.

The second is to be for marking the degrees, which the index of the hygrometer points to at the same time.

The third is for shewing the number of inches and parts of an inch, where the spirits stand in the thermometer at the time when the observation is made.

The fourth is for marking from what point the winds blow, and their strength.

The fifth is for noting the quantity of rain, &c. that falls, and what disposition the clouds and air have.

Take, for example, the following account of the 2d of June, 1721, which table is inserted underneath.

According to this method, a weather book may be kept of the country a person resides in; and by comparing the motions of the quicksilver and spirit with the weather, at such times as the observations are made, a little practice will enable a person to give a good judgment beforehand what weather will happen.

The T A B L E.

<i>Friday, June 2, 1721.</i>	<i>Barometer.</i>	<i>Hygrometer, with its Di- visions and Parts.</i>	<i>Thermom.</i>	<i>Wind.</i>	<i>Weather.</i>
	<i>Inch. Par.</i>				
Morning at 9.	29 98	240	30	East, brisk Gale.	Cloudy.
Noon.	29 98	260 20	28	East, brisk Gale, or ditto.	
Afternoon at 3.	29 98	280 20	28	Ditto.	Ditto.
Afternoon at 6.	29 98	300 20	27	Ditto.	Ditto.
Evening at 9.	29 98	315 15	28	Ditto.	Ditto.
Midnight.	29 98	320 5	28	Ditto.	Ditto.

Mr. Boyle, by placing a thermometer in a cave, which was cut strait into the bottom of a cliff, fronting the sea, to the depth of 130 feet, found the spirit stood, both in winter and summer, at a small division above temperate; the cave had eighty feet depth of earth above it.

I, says Dr. Hales, marked six thermometers numerically, 1, 2, 3, 4, 5, 6. The thermometer, number 1, which was the shortest, I placed with a south aspect in the open air; the ball of number 2, I set two inches under ground; that of number 3, four inches; number 4, eight inches; number 5, sixteen inches; and number 6, twenty-four inches: and that the

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heat of the earth at those several depths may the more accurately be known, it is proper to place near each thermometer a glass tube, sealed at both ends, of the same length with the stems of the several thermometers, and with tinged spirit of wine in them to the same height as in each corresponding thermometer; the scale of degrees of each thermometer being marked on a sliding ruler, with an index at the back of it, pointing to the corresponding tube.

When at any time an observation is to be made, by moving the index to point to the top of the spirit in that tube, an accurate allowance is hereby made for very different degrees of heat and cold in the stems of the thermometers at all depths; by which means the scale of degrees will shew truly the degrees of heat in the balls of the thermometers, and consequently the respective heats of the earth at the several depths where they are placed.

The stems of these thermometers, which were above the ground, were fenced from weather and injuries, by square wooden tubes. The ground they were placed in, was a brick earth in the middle of my garden.

July the 30th he began to keep a register of their rise and fall: during the following month of August he observed, that when the spirit in the thermometer, number 1, (which was exposed to the sun) was about noon risen to 48 degrees, then the second thermometer was 45, the fifth 33, and the sixth 31; the third and fourth at intermediate degrees: the fifth and sixth thermometers kept nearly the same degree of heat, both night and day, till towards the latter end of the month; when, as the days grew shorter and cooler, and the nights longer and cooler, they then fell to 25 and 27 degrees.

Now so considerable a heat of the sun, at two feet depth under the earth's surface, must needs have a strong influence in raising the moisture at that and greater depths, whereby a very great and continual reek must always be ascending during the warm summer season, by night as well as by day; for the heat at two feet deep is nearly the same night and day; the impulse of the sun-beams giving the moisture of the earth a brisk undulating motion; which watery particles, when separated and rarefied by heat, ascend in the form of a vapour; and the vigour of the warm and confined vapour (such as that which is one, two, or three feet deep in the earth) must be very considerable, so as to penetrate the roots with some vigour; as we may reasonably suppose from the vast force of confined vapour in æolipies, in the digester of bones, and the engine to raise water by fire.

If plants were not in this manner supplied with moisture, it were impossible for them to subsist under the scorching heat within the tropics, where they have no rain for many months together; for though the dews are much greater there than in these more northern climates, yet, doubtless, where the heat so much exceeds ours, the whole quantity evaporated in a day there, does as far exceed the quantity that falls by night in dew, as the quantity evaporated here in a summer's day is found to exceed the quantity of dew which falls in the night.

But the dew which falls in a hot summer season cannot possibly be of any benefit to the roots of trees; because it is remanded back from the earth by the following day's heat, before so small a quantity of moisture can have soaked to any considerable depth.

The great benefit therefore of dew in hot weather must be, by being plentifully imbibed into vegetables, thereby not only refreshing them for the present, but also furnishing them with a fresh supply of moisture, towards the great expences of the succeeding day.

It is therefore probable, that the roots of trees and plants are thus, by means of the sun's warmth, constantly irrigated with fresh supplies of moisture; which, by the same means, insinuates itself with some vigour into the roots; for if the moisture of the earth were not thus actuated, the roots must then receive

receive all their nourishment merely by imbibing the next adjoining moisture with the earth; and consequently the shell of the earth, next the surface of the roots, would always be considerably drier, the nearer it is to the root, which I have not observed to be so.

And by experiments 18 and 19, the roots would be very hard put to it to imbibe sufficient moisture in dry summer weather, if it were not thus conveyed to them by the penetrating warmth of the sun; whence by the same genial heat, in conjunction with the attraction of the capillary sap-vessels, it is carried up through the bodies and branches of vegetables; and thence passing into the leaves, it is there most vigorously acted upon in those thin plates, and put into an undulating motion by the sun's warmth, whereby it is most plentifully thrown off, and perspired through their surface; whence, as soon as it is disentangled, it mounts with great rapidity in the free air.

But when, towards the latter end of October, the vigour of the sun's influence is so much abated, that the first thermometer was fallen to three degrees above the freezing point, the second to ten degrees, the fifth to fourteen degrees, and the sixth to sixteen degrees; then the brisk undulations of the moisture of the earth, and also of the ascending sap, much abating, the leaves faded and fell off.

The greatest degree of cold in the following winter, was in the first twelve days of November, during which time, the spirit in the first thermometer was fallen four degrees below the freezing point, the deepest thermometer ten degrees; the ice on ponds was an inch thick; the sun's greatest warmth at the winter solstice, in a very serene, calm, frosty day, was, against a south aspect of a wall, 19 degrees, and in a free open air, but 11 degrees above the freezing point.

From the 10th of January to the 29th of March was a very dry season, when the green Wheat was generally the finest that was ever remembered: but from the 29th of March, 1725, to the 29th of September following, it rained more or less every day, except ten or twelve days about the beginning of July; and that whole season continued so very cool, that the spirit in the first thermometer rose but to 24 degrees, except now and then a short interval of sun-shine; the second only to 20 degrees, the fifth and sixth to 24 and 23 degrees, with very little variation; so that, during this whole summer, those parts of roots which were two feet under ground, had three or four degrees more warmth than those which were but two inches under ground; and at a medium, the general degree of heat through this whole summer, both above and under ground, was not greater than the middle of the preceding September.

THLASPI. Tourn. Inst. R. H. 212. tab. 101. Lin. Gen. Plant. 719. [Θλάσπι, so called of θλάω, to compress or squeeze together, because the seed-vessels of it are very much compressed.] Mithridate, or Treacle Mustard.

The CHARACTERS are,

The empalement of the flower is composed of four oval concave petals which fall off. The flower has four oval petals double the size of the empalement, placed in form of a cross; it has six stamina half the length of the petals, two of which are shorter than the others, terminated by acute summits, and a roundish compressed germen supporting a single style the length of the stamina, crowned by an obtuse stigma. The germen afterward becomes an oval, heart-shaped, compressed little pod, with an acute border divided into two cells by an intermediate partition, containing two or three seeds in each.

This genus of plants is ranged in the first section of Linnæus's fifteenth class, which contains those plants whose flowers have four long and two shorter stamina, and the seeds are included in short pods.

The SPECIES are,

1. **THLASPI** (*Campestre*) filiculis subrotundis, foliis sagittatis dentatis incanis. Hort. Cliff. 330. *Treacle Mustard with roundish pods, and arrow-pointed, hairy, and indented leaves.* Thlaspi arvense, vaccariæ incano

folio majus. C. B. P. 106. *Mithridate Mustard, or Bastard Cress.*

2. **THLASPI** (*Arvense*) filiculis orbiculatis, foliis oblongis dentatis glabris. Flor. Lapp. 251. *Treacle Mustard with orbicular pods, and oblong, indented, smooth leaves.* Thlaspi arvense filiquis latis. C. B. P. 105. *Treacle Mustard, or Penny Cress.*
 3. **THLASPI** (*Perfoliatum*) filiculis obcordatis, foliis caulinis cordatis glabris subdentatis, petalis longitudine calycis, caule ramoso. Lin. Sp. Plant. 902. *Treacle Mustard with heart-shaped, smooth, indented leaves, the petals of the flower as long as the empalement, and a branching stalk.* Thlaspi arvense, perfoliatum majus. C. B. P. 106. *The greater, wild, perfoliate Treacle Mustard.*
 4. **THLASPI** (*Alpestre*) filiculis obcordatis, foliis subdentatis, caulinis amplexicaulibus, petalis longitudine calycis, caule simplici. Lin. Sp. Plant. 903. *Treacle Mustard with heart-shaped leaves embracing the stalks, the petals of the flower as long as the empalement, and a single stalk.* Thlaspi perfoliatum minus. C. B. P. 106. *The least perfoliate Treacle Mustard.*
 5. **THLASPI** (*Peregrinum*) filiculis suborbiculatis, foliis lanceolatis integerrimis. Lin. Sp. Plant. 903. *Treacle Mustard with orbicular pods, and spear-shaped entire leaves.* Thlaspi capsulis cordatis peregrinum. Bocc. Hist. 2. 927. *Foreign Treacle Mustard with heart-shaped pods.*
 6. **THLASPI** (*Alliaceum*) filiculis subovatis ventricosis, foliis oblongis obtusis dentatis glabris. Prod. Leyd. 334. *Treacle Mustard with almost oval swelling pods, and oblong, blunt, smooth, indented leaves.* Thlaspi Allium redolens. Mor. Hist. 2. p. 297. *Treacle Mustard with the smell of Garlick.*
 7. **THLASPI** (*Hirtum*) filiculis subrotundis pilosis, foliis caulinis sagittatis hirsutis. Prod. Leyd. 333. *Treacle Mustard with roundish hairy pods, and hairy arrow-pointed leaves on the stalks.* Thlaspi villosum capsulis hirsutis. C. B. P. 106. *Perennial Mithridate Mustard.*
 8. **THLASPI** (*Montanum*) filiculis obcordatis, foliis glabris radicalibus carnosissimis obovatis integerrimis, caulinis amplexicaulibus corollis calyce majoribus. Lin. Sp. Plant. 902. *Treacle Mustard with heart-shaped pods, the lower leaves smooth and entire, and the upper embracing the stalks.* Thlaspi foliis globulariæ. J. B. 2. p. 926. *Treacle Mustard with a blue Daisy leaf.*
- The first sort grows naturally amongst the Corn in divers parts of England, as also on the side of dry banks; it is a biennial plant, which perishes soon after it has ripened its seeds. The root is composed of ligneous fibres which spread in the ground; the leaves are near three inches long, narrow at their base, and broader toward their points, where they have several indentures; they are hoary on both sides. The stalk rises about a foot high, branching out toward the top, and is pretty closely garnished with leaves placed alternately, sitting close to the stalks, whose ears embrace the stalk. The flowers are produced in short spikes at the end of the stalks; they are small, white, and composed of four petals placed in form of a cross; these appear in June, and are succeeded by roundish capsules having two cells, containing two or three seeds in each, which ripen in August. The whole plant has a warm-biting taste. The seeds of this are frequently used instead of those of the next, which is the sort directed to enter the composition of Venice treacle.
- The second sort is an annual plant, which grows naturally in several parts of England: I have found it growing in plenty in the meadows on the right hand side of Godalming. The root of this is composed of slender fibres; the stalk rises a foot high, is angular, channelled, and smooth; the leaves are about two inches long, are smooth and indented, of a deep green colour, and sit close to the stalks; the flowers are produced in loose spikes toward the upper part of the stalks; they are small, white, and composed of four petals placed crosswise like the former; these are succeeded by broad, flat, roundish, compressed pods, having leafy borders which have two cells, each

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each containing two or three dark brown seeds tasting like Garlick. It flowers in June, and the seeds which are an ingredient in Theriaca, ripen in August.

The third sort is an annual plant, which grows naturally in the northern counties of England. The stalks of this rise about nine inches high, which are divided at the top into several branches, which are clothed with oblong heart-shaped leaves, whose base embrace the stalks; they are smooth and entire. The flowers are small, white, and are produced in loose short spikes at the end of the branches: they appear the beginning of June, and the seeds ripen early in August.

The fourth sort is an annual plant, which grows naturally in some parts of England; the stalk rises about four inches high, is single, and never branches out; the leaves embrace the stalks at their base; the flowers are produced at the top of the stalks; the petals are the size of the empalement, which are succeeded by roundish heart-shaped pods, containing round seeds.

The fifth sort grows naturally in Sicily; this is a biennial plant, whose stalks rise eight or nine inches high, branching out toward the top, and are garnished with blunt thick leaves, of a grayish colour, which are spear-shaped and entire; they are placed opposite, sitting close to the stalk; they have a bitter warm taste. The flowers are produced in loose spikes at the top of the stalks; they are small and of a purple colour, having four heart-shaped petals placed in form of a cross; these are succeeded by heart-shaped pods of a fine green colour, which are divided into two cells, each containing three or four small, oblong, yellowish seeds, which have an acrid taste. It flowers in June, and the seeds ripen in August.

The sixth sort is an annual plant, which grows naturally in the northern parts of Europe; this rises about six or eight inches high. The stalk branches toward the top, and is garnished with oblong, smooth, blunt leaves which are a little indented; these sit close to the stalk, and, if bruised, have a strong scent of Garlick. The branches are terminated by loose spikes of small white flowers, composed of four roundish petals, placed in form of a cross; these appear in June, and are succeeded by swelling roundish pods, containing a few dark brown seeds which ripen in July.

The seventh sort grows naturally in Wales, and in a few places in England; this has a perennial creeping root. The lower leaves are oblong and hoary; they are very slightly sinuated, but not indented on the edges. The stalks are about five or six inches long, and are bent toward the ground; the flowers are rather larger than those of the first sort, but are of the same form; the pods are hoary, but not hairy. It flowers in May, and the seeds ripen in July. This grows naturally on the side of a bank beyond Wandsworth in the road to Putney.

The eighth sort grows naturally upon the Alps, and in some parts of Yorkshire in dry stony pastures. The root of this is perennial and creeping; the stalks rise four or five inches high; the lower leaves are wedge-shaped, being broad and rounded at their points, but narrow at their base, of a deep green colour, and entire; those upon the stalks are rounder, and sit very close. The flowers are produced in loose spikes at the end of the branches; they are small and white, shaped like those of the other sorts, and appear in May; these are succeeded by roundish heart-shaped pods divided into two cells, each containing two or three brown seeds which ripen in July. These plants are propagated by seeds, which should be sown where the plants are to remain, which may be performed either in the spring or autumn, but the latter is to be preferred, because the seeds at that season never fail; and the plants which come up before winter will grow much stronger, and produce a greater quantity of seeds than those which are sown in the spring, especially if the season proves dry; and there is very little danger of the plants being injured by

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frost in winter, if they are upon dry ground. When the plants come up, they will require no other care but to thin them where they are too close, and keep them clean from weeds.

The two sorts which are first mentioned, may be cultivated for their seeds to be used in medicine, so these may be sown thin upon beds of light ground, in the same way as for other garden plants, and when they come up, the ground should be hoed to destroy the weeds, and where the plants are too thick, they should be cut up in the same manner as is practised for Onions, Carrots, &c. leaving them three or four inches apart, and by twice hoeing the ground, if it is well performed, and in dry weather, will keep the ground clean till the seeds are ripe.

The other sorts are seldom cultivated but in botanic gardens for variety, so a few plants of each will be sufficient; therefore these may be sown in drills, and when the plants come up they must be thinned, and kept clean from weeds. If the seeds of these plants are permitted to scatter, the plants will come up without care.

THISTLE. See *CARDUUS*.

THORN APPLE. See *DATURA*.

THORN, the Glastenbury. See *MESPILUS* and *CRA-TEGUS*.

THUNDER is defined by some to be a noise in the lowest region of the air, excited by a sudden kindling of sulphureous exhalations.

Some also account for it, by supposing two clouds impending over one another, the upper and rarer whereof becoming condensed by a fresh accession of the air, raised thither by warmth from the lower parts of the atmosphere, or driven upon it by the wind, immediately falls forcibly down upon the lower and denser clouds, by which fall the air interposed between the two being compressed, that next the extremities of the two clouds is squeezed out, and leaves room for the extremity of the upper cloud to close tight upon the under. Thus a great quantity of air is inclosed, which, escaping through some winding irregular vent or passage, occasions the noise we call Thunder.

But this only reaches to the phænomena of Thunder heard without lightening, and in effect we have now a better solution: that Thunder is not occasioned by the falling of the clouds, but by the kindling of sulphureous exhalations in the same manner as the noise of aurum fulminans.

Sir Isaac Newton says, there are sulphureous exhalations always ascending into the air, when the earth is dry; there they ferment with the nitrous acids, and sometimes taking fire, generate into Thunder, lightning, &c.

That besides the vapours raised from water, &c. there are also exhalations carried off from sulphur, bitumen, volatile salts, &c. is past all doubt. The vast quantity of sulphureous and bituminous matter all over the surface of the earth, and the volatile salts of plants and animals, afford such an ample stock thereof, that it is no wonder the air should be filled with such particles, raised higher and lower, according to their greater or less degree of subtilty and activity, and more copiously spread in this or that quarter, according to the directions of the winds, &c.

The atmosphere about the earth abounds with nitrous particles of a spirituous nature, which are every where carried along with it; besides which sort of particles, there are others raised up into the air which may be somewhat of the nature of sulphureous, nitrous, and other combustible bodies, as we see spirit of wine, spirit of turpentine, camphire, and almost all other combustible bodies, will by heat be rarefied into the form of air or smoke, and be raised up into the air.

All which, if they have a sufficient degree of heat, will catch fire, or be turned into flame by the nitrous parts of the air, as thousands of experiments might be brought to prove.

Dr. Wallis in Philof. Tranfact. N^o 231, fays, That Thunder and lightning are fo very like the effects of fired gunpowder, that we may reasonably judge they proceed from the like caufe.

Now the prinipal ingredients in gunpowder are nitre and fulphur (the admiffion of charcoal being chiefly to keep their parts feparate, for the better kindling of it;) fo that if we fuppofe in the air a convenient mixture of nitrous and fulphureous vapours, and thofe by accident to take fire, fuch explofion may well follow with noife and light, as in the firing of gunpowder; and being once kindled, it will run from place to place, as the vapour leads it, like as in a train of gunpowder, with the like effects.

This explofion, if high in the air, and far from us, will do no mischief, or not confiderable, like a parcel of gunpowder fired in the open air, where nothing is near enough to be hurt by it; but if the explofion be near to us, or amongft us, it may kill men or cattle, tear trees, fire gunpowder, break houfes, or the like, which gunpowder would do in the like circumftances. This nearnefs or farness may be eftimated by the diftance of the time between feeing the fafh of lightning, and hearing the clap of Thunder; for though in their generation they be fimultaneous, yet light moving fafter than found, they come to us fucceffively.

I have obferved, that commonly the noife is about feven or eight feconds after the fafh, but fometimes it is much fooner, in a fecond or two, or lefs than that, juft after the fafh; and then the explofion muft needs be very near us, and even amongft us, and in fuch cafes, I have more than once prefaged the expectation of mischief, and it hath proved accordingly.

The noife of Thunder is more diverfified in cloudy weather, becaufe the air is variously reverberated from the clouds to us; but if there are no clouds, the air flows through the open fpaces to our ears, more freely and evenly, and it frequently lightens in fuch weather without Thunder, becaufe the inflammation confifts only of fulphureous particles, and on the contrary it often thunders in cloudy weather without any lightning appearing vifibly, becaufe it is intercepted by the clouds.

Rain generally attends Thunder and lightning, either at the fame time, or foon after, and it frequently rains fafter after a clap of Thunder, fo that rain feems to be the effect of Thunder.

As for Thunderbolts; when it thunder and lightens, there fometimes falls a Thunderbolt. This Thunderbolt is a moft rapid flame, that darts out of the clouds to the ground, and ftrikes every thing that is in its way, and it is obferved to have the following peculiar phaenomena:

1. That it oftener ftrikes upon high places than low, as upon mountains, towers, fteeples, trees, &c.
2. That it fometimes burns peoples clothes without hurting their bodies.
3. That it fometimes breaks their bones, and at the fame time does not hurt their flefh or their garments.
4. That it has melted or broken a fword in a fcabbard without hurting the fcabbard; and, on the contrary, has fometimes burnt the fcabbard all over, and at the fame time done no harm to the fword.

From thefe confiderations we may conclude that a Thunderbolt is an exhalation kindled on a fudden, and is copious enough to be hurried down to us by winds.

Thunderbolts are moft commonly darted aflope through the air, and this may be occafioned by the winds, which feldom or never blow downright. And it is probable, that the flame is beaten down by the wind, and reaches the ground before the matter of it is quite fpent.

And this may be the reafon that for the moft part they ftrike upon high places; for, as they fall obliquely through the air, they often in their way meet with mountains, towers, &c. and the reafon that the force of their flame is very different, is probably from the difference of the exhalations which form the Thunderbolts, the bodies from which they are col-

lected being fulphureous, bituminous, or faline, and from thence it may be, that it fometimes burns garments, at the fame time that it paffes over the bodies without doing them any harm.

Sometimes it penetrates the foft flefh harmlefsly, and yet breaks the hard bones, as gold and other metals are diffolved by aqua-regia and aqua-fortis, and in the mean time the paper fhall not be hurt by them: and for the fame reafon it is, that a fword may be melted in a fcabbard, and yet the fcabbard remain entire; and fo it would be if they were both laid together in aqua-fortis, becaufe the acute parts of the aqua-fortis do not operate upon the foft matter, the particles of which are branched, as they do upon harder bodies, into the pores of which they infinuate themfelves, and diffolve the contexture.

The effects of lightning upon vegetables are fometimes very great; it fplits down trees, and there has been many instances where the bodies of large trees have been torn to pieces, and the chips fcattered to a great diftance, but instances of this are pretty rare. The killing of branches or parts of trees is very common and fudden; for when this happens, that part of the tree where the lightning ftrikes, will in a very few hours appear as dead as if it had been fome days fevered from the trees.

THURIFEROUS fignifies bearing or producing frankincenfe.

THUYA. Tourn. Inf. R. H. 586. tab. 358. Lin. Gen. Plant. 957. [fo called of *Thū*, to perfume with fmoke, becaufe this plant hath a penetrating fmell.] The Arbor Vitæ, vulgò; in French, *Arbre de Vie*.

The CHARACTERS are,

It has male and female flowers in the fame plant; the male flowers are produced in an oval katkin. The flowers are placed oppofite upon the common foot-ftalk, each flower embracing it with its bafe; thefe come out of an oval concave fcale; they have no petals, but have four ftamina which are fcarce difcernible; their fummits adhere to the bafe of the fcale of the empalement. The female flowers are collected in a common almoft oval cone, two flowers ftanding oppofite in each fcale; they have no petals, but have a fmall germen, fupporting a fender fyle, crowned by a fingle ftigma; thefe are fucceeded by an oblong oval cone, opening longitudinally, whofe fcales are almoft equal, convex on the outfide, and obtufe, each containing an oblong feed with a membranaceous wing.

This genus of plants is ranged in the ninth fection of Linnæus's twenty-firft clafs, which contains thofe plants which have male and female flowers on the fame plant, and their ftamina are collected in one body.

The SPECIES are,

1. **THUYA** (*Occidentalis*) ftrobilis lævibus, squamis obtufis. Hort. Cliff. 449. *Thuya with fmoth cones and obtufe fcales.* Thuya Theophrasti. C. B. P. 488. *The common Arbor Vitæ.*
2. **THUYA** (*Orientalis*) ftrobilis squarrofis, squamis acuminatis reflexis. Hort. Upfal. 289. *Thuya with rugged cones, and acute-pointed reflexed fcales.* Thuya ftrobilis uncinatis, squamis reflexo-acuminatis. Flor. Leyd. Prod. 87. *The China Arbor Vitæ.*

The firft fort grows naturally in Canada, Siberia, and other northern countries, but has been long an inhabitant in the Englifh gardens. In fome of thefe gardens, which have not been altered, there are fome of thefe trees which are of a large fize: it has a ftrong woody trunk, which rifes to the height of forty feet or more. The bark, while young, is fmoth, and of a dark brown colour, but, as the trees advance, the bark becomes cracked and lefs fmoth. The branches are produced irregularly on every fide, ftanding almoft horizontal, and the young fender fhoots frequently hang downward; thefe branches ftand but thin, and the younger branches only are garnifhed with leaves, fo that when the trees are grown large, they make but an indifferent appearance, being fo thinly clothed with leaves. The young branches are flat, and the fmall leaves are placed imbricatim over each other like the fcale of fifh; the flowers are produced from the fide of the young branches, pretty near to the foot-ftalk; the

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male flowers grow in oblong katkins, and between these the female flowers are collected in form of cones. When the former have shed their farina, they soon after drop off, but the female flowers are succeeded by oblong cones, having obtuse smooth scales, containing one or two oblong seeds. It flowers early in the spring, and the seeds ripen in September. The leaves of this tree have a rank oily scent when bruised.

The second sort grows naturally in the northern parts of China, where it rises to a considerable height, but this has not been long enough in Europe to have any trees of large size here. The seeds of this sort were first sent to Paris by some of the missionaries, and there are some of the trees growing in the gardens of some curious persons there, which are more than twenty feet high. The branches of this sort grow closer together, and are much better adorned with leaves, which are of a brighter green colour, so make a much better appearance than the other; and being very hardy, is esteemed much preferable to most of the evergreen trees with small leaves, for ornament in gardens. The branches of this tree cross each other at right angles; the leaves are flat, but the single divisions of the leaves are slender, and the scales are smaller, and lie closer over each other than those of the first sort. The cones are also much larger, and of a beautiful gray colour; their scales end in acute reflexed points.

Both these trees may be propagated by seeds, layers, or cuttings. The first sort is commonly propagated by cuttings; these should be planted in September, upon a shady border and in a loamy soil; the cuttings should be chosen from the shoots of the same year, with a small joint of the former year's wood at the bottom of each. These should be planted three or four inches deep, in proportion to their length, treading the ground close to them, to prevent the admission of air. If the following spring should prove dry, there should be a little mulch laid over the surface of the ground to prevent its drying; where this is performed in time, it will save the trouble of watering the cuttings, and it will be much better for them, because when these are putting out their young fibres, if they are much watered, it will rot them while they are tender. These cuttings will be rooted enough to transplant by the next autumn, when they may be either planted in beds, or in nursery rows to be trained up.

When they are propagated by layers, the young branches only should be laid down in autumn, which will also put out roots by the next autumn, when they may be taken up, and transplanted in the same manner as those raised from cuttings: but although these are very expeditious methods of propagating this tree, yet those who are desirous to have large trees, should always propagate them by seeds, for the plants so raised will be much preferable to the other.

There is a variety of the first sort with variegated leaves, which some people keep in their gardens for the sake of variety; but as this proceeds from a weakness in the plants, so whenever the plants become strong and vigorous, they always return to their plain colour again, to prevent which they generally plant them in very poor ground. This variety can only be preserved by propagating the plants either by cuttings or layers.

The China sort is generally propagated by layers in the same way as the former; but the cuttings of this, if rightly managed, will take root very freely; but most people have over-nursed them. If these are planted in September in a border of soft loam, exposed to the east, and before hard frost sets in, and the surface of the ground covered with old tanners bark about two inches thick, it will prevent the frost from penetrating the ground very deep; and if this remains in the spring, it will also keep the ground moist; for if these cuttings, or the layers of this sort are watered in the spring, when they are beginning to put out young fibres, it will certainly rot them, as I have frequently experienced; therefore I advise every one

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not to water these cuttings or layers, nor should the plants be much watered when they are transplanted, for the same reason: but as there are many plants now in England which ripen their seeds, so those who can be supplied with them should prefer this to both the other methods of propagating the plants; for, after the two first years, the seedling plants will greatly outstrip the other in growth, and the plants growing with their branches closer, will be much handsomer.

These seeds should be sown soon after they are ripe, which is in the spring. These should be sown in pots filled with soft loamy earth, and plunged into the ground in an east border, where they may have only the morning sun, observing always to keep the pots clean from weeds. Sometimes these seeds will come up the same year, but they often lie in the ground till the next spring; therefore the pots should be put in a common hot-bed frame in winter, and in the spring the plants will come up; these must not be too much exposed to the sun the first year, and if in the next winter they are sheltered under a frame, it will be a good way to preserve them, and the spring following they may be transplanted into beds, and treated in the same way as those propagated by cuttings.

THYMBRA. Lin. Gen. Plant. 627.

The CHARACTERS are,

It has an empalement of one leaf whose brim is cut into into two lips; the upper lip is broad, and has three equal points; the under is narrow, and cut into two parts. The flower is of one petal, of the lip kind. The upper lip is concave, and cut into two obtuse segments. The lower lip ends with three almost equal points; it has four slender stamina, the two under being shorter than the other, terminated by twin summits under the upper lip, and a four-pointed germen supporting a slender half bifid style, crowned by acute stigmas. The germen afterward become four seeds which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which includes those plants whose flowers have two long and two shorter stamina, and the seeds ripen in the empalement.

The SPECIES are,

1. THYMBRA (*Spicata*) floribus spicatis. Lin. Sp. Plant. 569. *Thymbra with spiked flowers.* Hyssopum montanum, Macedonicum, valerandi dourez. I. B. 3. 2. 276. *Mountain Macedonian Hyssop.*
2. THYMBRA (*Verticillata*) floribus verticillatis. Lin. Sp. Plant. 569. *Thymbra with whorled flowers.* Hyssopus angustifolia, montana, aspera. C. B. P. 218. *Rough, narrow-leaved, Mountain Hyssop.*

The first sort grows naturally on Mount Libanus, in Macedonia, and in Spain; it is a low shrubby plant like Heath, branching out into slender ligneous stalks which are six or eight inches long, covered with a brown bark, and garnished with narrow acute-pointed leaves about half an inch long, sitting close to the stalks opposite; they have an aromatic odour when bruised. The stalks are terminated by thick close spikes of purple flowers, near two inches long. The empalements are stiff and hairy; they are cut half their length into acute segments, out of these the flowers peep, with their two lips; the upper is concave and arched, the under is cut into three equal portions, and these are a little reflexed. These appear in June and July, and in warm seasons they are sometimes succeeded by seeds which ripen in autumn.

The second sort grows naturally in Spain and Italy; this has a shrubby stalk which seldom rises much more than a foot high, putting out many small ligneous branches, which are garnished with narrow spear-shaped leaves which have many punctures; they stand opposite, and are of an aromatic flavour. The flowers grow in whorled spikes at the end of the branches. The leaves which stand under each whorl are broader than those below, and are covered with fine hairs. The flowers are purple, and sit close to the stalks; the upper lip is concave and ends with two obtuse points, the lower ends with three equal points. These appear about the same time with the other, and in warm seasons the seeds ripen in England.

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These plants are propagated by seeds, which should be sown in the spring on a bed of light earth, where, if the seeds are good, the plants will appear in about six or eight weeks. When they come up they must be kept clean from weeds, and in July they will be fit to remove, at which time part of them should be planted in small pots; and the other may be planted in a warm border of dry ground, being careful to shade them from the sun, and supply them with water till they have taken new root; after which, those in the full ground will require no other care but to keep them clean from weeds; and, if the winter should prove very severe, they should be covered with mats, or some other covering to protect them, for the young plants are in greater danger of being destroyed than those which are older. Those plants in the pots should be sheltered under a common frame in winter, where they may enjoy the free air in mild weather, and be protected from hard frost.

These plants will live in the open air in England unless the winters prove very severe, especially if they are planted in a poor, dry, stony soil.

THYMELÆA. See DAPHNE and PASSERINA.

THYMUS. Tourn. Inst. R. H. 196. tab. 93. Lin. Gen. Plant. 646. [so called of *Θύμης*, odour, because a very odorous plant; or of *Θυμὸς*, animal spirit, because good in reviving the same.] Thyme.

The CHARACTERS are,

The flower has a permanent empalement of one leaf, divided into two lips, whose chaps are hairy and shut. The upper lip is broad, plain, erect, and indented in three parts; the under lip ends in two equal bristles. The flower is of the lip kind; it has one petal, with a tube the length of the empalement. The chaps are small; the upper lip is short, erect, obtuse, and indented at the point; the lower lip is long, broad, and divided into three parts, the middle segment being broadest. It has four incurved stamina, two being longer than the other, terminated by small stamens; and a four-pointed germen supporting a slender style, crowned by a bifid acute stigma. The germen afterwards turn to four small roundish seeds ripening in the empalement, whose neck is narrowed.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which contains those plants whose flowers have four stamens, two of them being longer than the other, and the seeds ripen in the empalement.

The SPECIES are,

1. THYMUS (*Vulgaris*) erectus, foliis revolutis ovatis, floribus verticillato-spicatis. Hort. Cliff. 305. Upright Thyme with oval leaves which turn backward, and flowers growing in whorled spikes. Thymus vulgaris, folio latiore. C. B. P. 219. Common broad-leaved Thyme.
2. THYMUS (*Tenuifolius*) foliis lineari-lanceolatis incanis, floribus verticillato-spicatis. Thyme with linear, spear-shaped, hoary leaves, and flowers growing in whorled spikes. Thymus vulgaris, folio tenuiore. C. B. P. 219. Common Thyme with narrow leaves.
3. THYMUS (*Cephalotos*) capitulis imbricatis magnis, bracteis ovatis, foliis lanceolatis. Lin. Sp. Plant. 592. Thyme with large imbricated heads, oval bractæ, and spear-shaped leaves. Thymus Lusitanicus cephalotos, squamis capitulorum amplioribus. Tourn. Inst. 126. Portugal Thyme with large heads, having very large scales.
4. THYMUS (*Villosus*) capitulis imbricatis magnis, bracteis dentatis, foliis setaceis pilosis. Lin. Sp. Plant. 592. Thyme with large imbricated heads, indented bractæ, and bristly hairy leaves. Thymus Lusitanicus, folio capillaceo villoso, capite magno purpurascens oblongo. Tourn. Inst. 196. Portugal Thyme with a hairy narrow leaf, and a large, oblong, purplish head.
5. THYMUS (*Serpyllum*) floribus capitatis, caulibus decumbentibus, foliis planis obtusis basi ciliatis. Flor. Suec. 477. Thyme with flowers growing in heads, trailing stalks, and plain obtuse leaves. Serpyllum latifolium hirsutum. C. B. P. 220. Broad-leaved hairy Mother of Thyme.
6. THYMUS (*Glabrus*) floribus capitatis, caulibus decumbentibus foliis lanceolatis glabris. Thyme with flowers growing in heads, trailing stalks, and smooth spear-shaped leaves. Serpyllum vulgare majus, flore

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purpureo. C. B. P. 220. Common greater Mother of Thyme, with a purple flower.

7. THYMUS (*Ovatus*) caulibus decumbentibus, foliis ovatis glabris, floribus verticillato-spicatis. Thyme with strong trailing stalks, oval smooth leaves, and flowers growing in whorled spikes. Serpyllum vulgare majus flore minore. Bot. Par. 183. Common greater Mother of Thyme, with a smaller flower.
8. THYMUS (*Lanuginosus*) caulibus decumbentibus, foliis ovato lanceolatis rigidis lanuginosis, floribus capitatis. Thyme with creeping stalks, oval, spear-shaped, stiff leaves, which are downy, and flowers growing in heads. Serpyllum saxatile, hirsutum, Thymi folium nanum, flore pupureo. Bot. Par. 183. Hairy Rock Mother of Thyme, having a dwarf Thyme leaf and a purple flower.
9. THYMUS (*Odoratissimus*) caulibus decumbentibus, foliis lineari-lanceolatis glabris, floribus alaribus terminalibusque. Thyme with trailing stalks, linear, spear-shaped, smooth leaves, and flowers growing at the wings and tops of the stalks. Serpyllum odoratissimum glabrum, longiore angustioreque folio. Amman. Smooth sweet-scented Mother of Thyme, with a longer and narrower leaf.

The first sort is the common Thyme, which is cultivated in the gardens for the kitchen, and also for medicine. This grows naturally on stony rocky places in the south of France, in Spain and Italy, and is so well known here as to need no description.

This plant may be propagated either by seeds or parting the roots; the season for either is in March or October. If it is propagated by seeds, they should be sown upon a bed of light earth, observing not to bury the seeds too deep, which will cause them to rot, nor to sow them too thick, for the seeds are very small. When the plants are come up, they should be carefully cleared from weeds; and if the spring should prove dry, and they are watered twice a week, it will greatly promote their growth. In June the plants should be thinned, leaving them about six inches asunder each way, that they may have room to spread; and those plants which are drawn out may be transplanted into fresh beds at the same distance, observing to water them until they have taken root; after which they will require no farther care but to keep them clear from weeds, and the winter following they may be drawn up for use.

But if the plants are propagated by parting their roots, the old plants should be taken up at the times before-mentioned, and slipped into as many parts as can be taken off the root; these should be transplanted into beds of fresh light earth, at six or eight inches distance, observing, if the season is dry, to water them until they have taken root, after which they must be duly weeded, and they will thrive, and soon be fit for use.

In order to save the seeds of these plants, some of the old roots should remain unremoved in the place where they were sown the preceding year; these will flower in June, and in July the seeds will ripen, which must be taken as soon as it is ripe, and beat out, otherwise the first rain will wash it all out of the husks. These plants root greatly in the ground, and thereby draw out the goodness of the soil sooner than most other plants; so that whatever is sown or planted upon a spot of ground whereon Thyme grew the preceding year, will seldom thrive, unless the ground be trenched deeper than the Thyme rooted, and well dunged.

If this plant grows upon walls, or on dry, poor, stony land, it will endure the greatest cold of this country; but in rich ground where the plants grow vigorously, they are sometimes destroyed by severe frost.

There is a variety of this with variegated leaves, which is by some preserved in their gardens.

The second sort has shorter stalks, the leaves are longer, narrower, and end in sharper points than the first, and the whole plant is hoary. The flowers grow in long whorled spikes, and are larger than those of the common Thyme. This may be propagated and treated in the same way as the first sort.

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The third sort grows naturally in Spain and Portugal; this has a low woody stalk, from which come out many stiff branches about five or six inches long, garnished with small, narrow, spear-shaped leaves placed opposite, and are terminated by pretty large heads of flowers, which come out from oval scaly leaves, lying over each other like the scales of fish; they are white, and but small, so make no great appearance. The whole plant is of a hoary colour, and has a weak aromatic scent. It flowers in July, but unless the season proves warm, the seeds do not ripen in England.

The fourth sort grows naturally in Portugal; this has slender, ligneous, hairy stalks, which grow erect, about six inches high, garnished with very narrow, bristly, hairy leaves, which, at the lower part of the stalks, come out in clusters, but upward they are placed by pairs. The stalks are terminated by single scaly heads. The leafy scales are indented in acute points; these lie over each other in the same order as the other, and between them the flowers peep out, which are of a purple colour, and shaped like those of the common Thyme. This plant flowers in July, but does not produce seeds in England.

These two sorts may be propagated by slips, if they are planted in April on an east border, and closely covered with a bell or hand-glass, refreshing them twice a week with water, which must not be given to them in too great quantity. When these have put out good roots, some of them may be transplanted into pots, to be sheltered under a frame in winter; the others should be planted on a warm border of dry ground, observing to shade and water them till they have taken new root. These plants will live through the winter in the open air in a warm dry situation, but in severe frost they are generally destroyed; they may be propagated by seeds when they can be procured. If these are sown on a bed of light earth in the same way as common Marjoram, the plants will come up, and may be treated as those raised from slips.

The fifth sort is the common Mother of Thyme, which is frequently titled wild Thyme; it grows naturally upon dry commons and pastures in most parts of England, so is very rarely admitted into gardens. This is so well known as to need no description. There is a very common mistake which has prevailed in regard to this plant, which is, that the sheep and deer which feed upon them, have much finer flavoured flesh than others, whereas no cattle will meddle with it; for in the places where it grows, when the Grass is as closely eaten down as possible, the wild Thyme will be found in flower with all its stalks entire.

Of this there are the following varieties: the small creeping Mother of Thyme without scent. Narrow-leaved Mother of Thyme smelling like the leaves of the Walnut-tree: shrubby Mother of Thyme with pale red flowers; and the Lemon Thyme. The last is frequently kept in gardens for the agreeable odour of its leaves; but when this is propagated by seeds, the plants have not the same scent; so it is an accidental variety, which is obtained by propagating it by slips and cuttings.

The sixth sort has broader and smoother leaves than the common sort; the stalks grow much longer; the joints are farther distant; the heads of flowers are larger, and the flowers are of a brighter purple colour. There is a variety of this with variegated leaves, which is propagated in gardens, and was formerly planted for edgings to borders; but it is now frequently brought in pots to the markets, to supply the London gardens.

The seventh sort has trailing stalks like the common kind, but they grow longer, and their joints are farther asunder; the leaves are oval, smooth, and of a lucid green. The flowers grow in close thick whorls which are distant from each other, forming a loose spike five or six inches long. The flowers of this sort are much smaller than those of the common sort, appearing but little beyond their emblems. This is

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pretty common in the neighbourhood of Paris, but is rarely found growing naturally in England.

The eighth sort grows naturally in the forest of Fontainebleau in France; this has trailing slender stalks like the first, which are garnished with small, oval, spear-shaped, hoary leaves; the young shoots of the same year are also very white and hoary. The leaves are stiffer than those of the other sorts. The flowers are produced in round heads at the end of the branches; they are of a bright purple colour, and appear at the same time as those of the other sorts.

The ninth sort grows naturally in Tartary; the stalks of this are long, slender, and trail upon the ground, but do not emit roots from their joints as many of the others do; the stalks are smooth, of a light brown colour, and are garnished with narrow spear-shaped leaves which are smooth. The stalks have small whorls of flowers at the wings of the leaves, and are terminated by oblong heads of flowers, whose empalements are hoary. The flowers are of a bright purple colour. The whole plant has an agreeable aromatic scent.

All these sorts may easily be propagated by those who are desirous to have them in their gardens, either by slips, or parting of their roots in the same manner as Thyme, or their seeds may be sown in the spring. They delight in dry undunged ground, where they will propagate themselves by their trailing stalks, and require no other care but to keep them clean from weeds.

THYME THE MARUM. See TEUCRIUM.

THYME THE MASTICH. See SATUREJA.

TIARELLA. Lin. Gen. Plant. 495. Cortusa. Herm. Par. Bat. 129. Sanicle.

The CHARACTERS are,

The flower has a permanent empalement divided into five oval acute parts; it has five oval petals the length of the empalement, and ten awl-shaped stamina which are much longer than the petals, terminated by roundish summits, and a bifid germen ending with two styles, crowned by single stigmas. The germen afterward becomes an oblong capsule with one cell, opening with two valves, containing several oval seeds.

This genus of plants is ranged in the second section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and two styles.

The SPECIES are,

1. TIARELLA (*Cordifolia*) foliis cordatis. Lin. Gen. Nov. 188. Sp. Plant. 580. *Tiarella with heart-shaped leaves.* Mitella Americana, florum petalis integris. Tourn. Inst. 242. *American Mitella with entire petals to the flower.*

2. TIARELLA (*Trifoliata*) foliis ternatis. Lin. Gen. Nov. 188. Sp. Plant. 405. *Tiarella with trifoliate leaves.* Mitella foliis ternatis. Amœn. Acad. 2. p. 351. *Mitella with ternate leaves.*

The first sort grows naturally in North America; this has a perennial fibrous root which creeps and multiplies, from which come out many heart-shaped leaves upon slender foot-stalks, which are three inches long, arising immediately from the root. The leaves are unequally indented on their edges, and are of a light green colour. The flowers stand upon slender naked foot-stalks, which arise immediately from the root between the leaves, which is about four inches long, and is terminated by a loose spike of small, herbaceous, white flowers which appear in May, but are seldom succeeded by seeds in England.

This plant is propagated by its creeping roots, which spread in the ground and shoot up heads; these may be taken off and transplanted in the autumn. It loves a moist soil and a shady situation, and requires no other care but to keep it clean from weeds.

The second sort grows naturally in the northern parts of Asia; this has a perennial fibrous root, from which spring up a few trifoliate leaves upon foot-stalks; these are like those of the Bilberry, but are much smaller. The stalk is slender, and rises five or six inches high; it is rough and hairy, garnished with two leaves at the bottom, and another toward the top, a little below the

the spike of flowers; they are angular and sawed on their edges. The stalk is terminated by a loose spike of flowers, which are composed of five small white petals inserted in the empalement, and ten awl-shaped stamina which are longer than the petals, terminated by roundish summits. These flowers appear early in May, but the plants rarely produce any seeds in England.

This sort is propagated by parting of the root, in the same manner as the former, and delights in a moist soil and a shady situation.

TILIA. Tourn. Inst. R. H. 611. tab. 381. Lin. Gen. Plant. 587. [of telum, a dart, because its wood is used in making darts.] The Lime, or Linden-tree; in French, *Tillau* or *Tilleul*.

The CHARACTERS are,

The flower has a concave coloured empalement, which is cut into five parts; it has five oblong blunt petals which are crenated at their points, and many awl-shaped stamina terminated by single summits, with a roundish germen supporting a slender style the length of the stamina, crowned by an obtuse five-cornered stigma. The germen afterwards becomes a thick globular capsule with five cells, opening at the base with five valves, each containing one roundish seed.

This genus of plants is ranged in the first section of Linnæus's thirteenth class, which contains those plants whose flowers have many stamina and one style.

The SPECIES are,

1. TILIA (*Cordata*) foliis cordatis acuminatis, inæqualiter ferratis, fructibus quinquæ locularibus tomentosis. *Lime-tree with heart-shaped acute-pointed leaves, which are unequally sawed, and a woolly fruit having five cells. Tilia foemina, folio minore. C. B. P. 426. The female Lime-tree with a smaller leaf.*
2. TILIA (*Europæa*) foliis acuminatis, ferratis, subhirsutis, fructibus quadrangularibus subpilosis. *Lime-tree with acute-pointed leaves which are sawed, somewhat hairy, and a hairy fruit having four cells. Tilia foliis molliter hirsutis, viminibus rubris, fructu tetragono. Raii Syn. 316. The red twigged Lime-tree.*
3. TILIA (*Americana*) foliis cordatis acuminatis ferratis, subtus pilosis floribus nectario instructis. *Lime-tree with heart-shaped, acute-pointed, sawed leaves which are hairy on their under side, and flowers furnished with nectariums. American black Lime.*
4. TILIA (*Caroliniana*) foliis cordatis obliquis glabris subserratis cum acumine, floribus nectario instructis. *Lime-tree with heart-shaped smooth leaves, which are oblique to the foot-stalk, somewhat sawed on their edges, ending in acute points, and flowers having nectariums. Tilia Caroliniana, foliis longius mucronato. Rand. Cat. Hort. Chelf. Carolina Lime-tree with a long-pointed leaf.*

The first sort grows naturally in the woods in many parts of England; of this there are two or three varieties, which differ in the size and smoothness of their leaves, some of them having much larger and rougher leaves than the others. I have plants of three of these varieties from seeds, but have constantly found them vary from one to the other; and I much doubt if the second is more than a seminal variety, but as I have not had an opportunity of raising any of the plants from seeds, I cannot possibly determine this.

The large-leaved Dutch Lime was generally preferred to our common sort for the size of its leaves, but of late years all these trees are little esteemed, because it is late in the spring before their leaves come out, and they begin to decay the first in autumn; and when the trees are planted in a dry soil, their leaves frequently decay in July, and are continually falling off, making a litter all the remaining part of summer.

The third sort was brought from New England by the title of Black Lime. The branches of this sort are covered with a dark brown bark. The leaves are large, heart-shaped, and end in acute points; they are deeply sawed on their edges, and are of a deep green on their upper side, but of a pale green and a

little hairy on their under side, standing upon long slender foot-stalks. The flowers are produced in bunches, in the same manner as those of the common Lime-tree, but the petals of the flowers are narrower, and have nectariums growing to their base. The flowers of this sort do not appear till late in July, so are a full month after the common sort. The capsules are smaller, rounder, and less hairy than those of the common sort.

The seeds of the fourth sort were brought from Carolina by the late Mr. Catesby. This tree seems to be of much smaller growth than either of the other sorts; the branches spread more horizontally. The leaves are smaller, and have a smoother surface than either of the other; they are heart-shaped, but the midrib runs oblique to the foot-stalk, so that one side of the leaves is much larger than the other. Their edges are slightly sawed, and their tops run out into long acute points. The bunches of flowers stand upon long slender foot-stalks; the petals of the flowers are narrow, and end in acute points; these have each a narrow nectarium fastened to their base on the inside, which stand erect close to the petals. The flowers emit a very fragrant odour, and are continually haunted by bees during their continuance. This tree flowers toward the end of July, and when the season proves favourable, the seeds ripen in autumn. All these trees are easily propagated by layers, which in one year will take good root, and may then be taken off, and planted in a nursery, at four feet distance row from row, and two feet asunder in the rows. The best time to lay them down and to remove them, is at Michaelmas, when their leaves begin to fall, that they may take root before the frost comes on, though they may be transplanted any time from September to March, in open weather; but if the soil is dry, it is much the better way to remove them in autumn, because it will save a great expence in watering them, especially if the spring should prove dry. In this nursery they may remain four or five years, during which time the ground should be dug every spring, and constantly kept clear from weeds, and the large side shoots pruned off, to cause them to advance in height; but the small twigs must not be pruned off from the stems, because these are absolutely necessary to detain the sap, for the augmentation of their trunks, which are apt to shoot up too slender, when they are entirely divested of all their lateral twigs. If the soil in which they are planted be a fat loam, they will make a prodigious progress in their growth, so that in three years time they will be fit to transplant out where they are to remain.

They may also be propagated by cuttings, but, as this method is not so certain as by layers, that method is generally practised. In order to obtain proper shoots for laying down, a Lime-tree is cut down close to the ground, from the roots of which a great number of strong shoots are produced the following year; these will be strong enough to lay down the following autumn, especially if the smallest of them are cut off close early in the summer; for when too many shoots are suffered to grow all the summer, they will be much weaker, than if only a sufficient quantity is left. The manner of laying down these shoots having been already directed under the article *LAYERS*, I need not repeat it here.

There are some persons who raise these trees from seeds, which, although it is a slower way, yet when the trees are designed to grow large, is the best method; and if they are only once transplanted, and this performed while they are young, it will be still the better way; for all trees that are transplanted when large, are shorter lived than those which remain in the places where they arose from seeds, and their timber will be sounder, and grow to a much larger size.

When this method is practised, the seeds should be sown in autumn soon after they are ripe, upon a shady border of moist light soil, where the plants will come up the following spring; but, when the seeds are

kept out of the ground till spring, the plants will not come up till the year after. When the plants appear, they should be constantly kept clean from weeds till the following autumn; then they should be carefully taken up and transplanted into a nursery, where they may grow two or three years to get strength, and then may be planted where they are designed to remain, for the younger they are planted out, the more they will thrive.

The timber of the Lime-tree is used by the carvers, it being a soft light wood, as also by architects for framing the models of their buildings; the turners likewise use it for making light bowls, dishes, &c. but it is too soft for any strong purposes.

These trees will continue growing, and remain sound a great number of years; and, if planted in a good loamy soil, will grow to a considerable bulk. I have measured one of these trees, which was near ten yards in girth two feet about the ground, and was then in a very thriving condition; and Sir Thomas Brown mentions one of these trees which grew in Norfolk, that was sixteen yards in circuit, a foot and a half above ground, in height thirty yards, and in the least part of the trunk it was eight yards and a half.

TINUS. See VIBURNUM.

TITHYMALUS. Tithymaloides. Tourn. Inst. App. 654. Euphorbia. Lin. Gen. Pl. 536. Spurge.

The CHARACTERS are,

The flower has an empalement of one leaf, indented in three parts; it has one petal which is shaped like a slipper, of a thick fleshy consistence. Under the upper part of the flower are situated the ten stamina, which are inserted in the receptacle of the flower; they are slender, and terminated by globular summits; in the center is situated a roundish three-cornered germen, supporting three bifid styles, crowned by oblong stigmas. The germen afterward becomes a roundish capsule having three cells, each containing one oval seed.

This genus of plants is by Dr. Linnæus joined to the Euphorbia, which is ranged in the third section of his eleventh class, which contains those plants whose flowers have ten or twelve stamina and three styles. But as the flowers of this genus differ greatly in their structure from those of Euphorbia, I have chosen to separate them, and have continued the old title of Tithymalus to the genus.

The SPECIES are,

1. TITHYMALUS (*Myrtifolius*) foliis ovatis acuminatis. Spurge with oval acute-pointed leaves. Tithymaloides frutescens folio myrti amplissimo. Tourn. Inst. 654. *Skrubby Bastard Spurge with a large Myrtle leaf.*
2. TITHYMALUS (*Lauro-cerasifolius*) foliis oblongo ovatis obtusis succulentis. Spurge with oblong, oval, obtuse leaves, which are very succulent. Tithymaloides lauro-cerasi folio non ferrato. Hort. Elth. 383. *Bastard Spurge with a Laurel leaf which is not sawed.*

The first sort grows naturally near Carthage in America, from whence Mr. Robert Millar, surgeon, sent the branches, which were planted here, and succeeded: this rises with shrubby succulent stalks to the height of twelve or fourteen feet, which are too weak to stand without support, though they are frequently as large as a man's little finger; but their leaves being succulent, are so heavy as to weigh down the branches if they are not supported. The leaves are oval, and terminate in acute points; they are two inches and a half long, and one inch and a half broad near their base; they are about the thickness of Bay leaves, and are ranged alternately on two sides of the branches, to which they fit close. The flowers are produced at the end of the branches three or four together; they are of a scarlet colour, of one petal in shape of a slipper; these are succeeded by roundish capsules with three furrows, dividing them into three cells, each containing one oblong seed. The whole plant abounds with an acrid milky juice. The second sort grows naturally in Barbadoes, and most of the other islands in the West-Indies, where the English inhabitants know it by the title of Poison Bush; this hath thick, shrubby, succulent stalks,

which will grow to the height of ten or twelve feet; these are larger than those of the first sort, and are garnished with oblong oval leaves ending with blunt points; they are above three inches long, and an inch and a half broad in the middle, of a very thick consistence, and of a dark green colour, ranged alternately on two sides of the stalk. The flowers grow at the end of the branches; they are shaped like those of the first sort, and are of a deep red colour; these are succeeded by roundish capsules divided into three cells, each containing one oblong seed.

This whole plant abounds with an acrid milky juice, which will draw blisters on the flesh wherever it is applied, and if it mixes with the blood, I have been credibly informed, it becomes a deadly poison; so that if the points of arrows, or the edges of swords are rubbed with this juice, it becomes deadly to any animal wounded with those weapons.

These plants are both propagated by cuttings, which may be taken from the plants during any of the summer months, and after having laid in a dry place for a fortnight or three weeks, until the wounded part be healed over, they should be planted into small pots filled with light sandy earth mixed with lime rubbish, and then plunged into a hot-bed of tanners bark, observing now and then to refresh them gently with moisture, but they should never receive much wet, which will rot them.

After they have taken root, they may have a greater share of air by raising the glasses, but they must never be wholly exposed to the open air. In this bed they may remain until the beginning of October, when they must be removed, and placed with the Melon and Torch Thistle in a warm dry stove, and during the winter season they should have very little water, which, if given in plenty, seldom fails to rot them.

These plants are too tender to thrive in the open air in England, therefore should constantly remain in the stove, observing in the summer season, when the weather is warm, to admit a large share of fresh air to them, and in the winter to place them in a warm part of the stove, otherwise they cannot be preserved.

They must be shifted every summer, and fresh earth given to them. If the earth is light and sandy, it will require no mixture, for rich or strong ground is very improper for them; therefore where the soil is inclinable to either of these, there should be a good mixture of sand and lime rubbish to prevent its binding, or detaining moisture.

These plants are preserved for their odd appearance amongst other succulent plants, their leaves being very large, thick, and full of a milky acrid juice.

TITHYMALUS. See EUPHORBIA.

TOAD FLAX. See LINARIA.

TOBACCO. See NICOTIANA.

TOLUIFERA. Lin. Gen. Plant. 470. Balsam of Tolu-tree.

The CHARACTERS are,

The flower has a bell-shaped empalement of one leaf, which is slightly indented in five parts at the brim; it has five petals inserted in the receptacle of the flower, four of which are narrow and equal, being a little longer than the empalement, and the fifth is much larger, and almost heart-shaped, having a tail the length of the empalement; it has ten short stamina, terminated by oblong erect summits, and a roundish germen supporting a very short style, crowned by an acute stigma. The germen afterward turns to a roundish fruit with four cells, each containing one oval seed.

This genus of plants is ranged in the first section of Linnæus's tenth class, which contains those plants whose flowers have ten stamina and one style.

We have but one SPECIES of this genus, viz.

TOLUIFERA (*Balsamum*.) Lin. Mat. Med. *The Balsam-tree of Tolu.* Balsamum Tolutanum, foliis ceratix similibus. C. B. P. 401. *Balsam-tree of Tolu, with leaves like those of the Carob.*

This

This tree grows naturally near Carthage in America, from whence the late Dr. Houstoun sent the seeds to England: in its native place this grows to a tree of large size. The bark is very thick, rough, and of a brown colour; the branches spread out wide on every side, and are garnished with winged leaves, composed of several oblong oval lobes placed alternately along the foot-stalk, terminated by an odd one; these are four inches long, and two broad in the middle; they are rounded at both ends, but run out to an acute point at the top; they are smooth, of a light green colour, and fit close to the foot-stalk. The flowers are produced in small bunches at the wings of the branches, each standing upon a slender foot-stalk almost an inch long; their empalements are of the round bell-shape, being of one leaf, which is slightly scalloped at the brim into five obtuse parts. The flower has four narrow petals of a yellow colour, which are a little longer than the empalement, and one more whose tail is of the same length of the other petals, and the top is of an oval heart-shape, stretched out beyond the other parts; it has ten short stamina within the tube of the flower, which are terminated by oblong erect summits of a sulphur colour, and at the bottom of the tube is situated a roundish germen, having a very short style, crowned by an acute-pointed stigma. After the flower is past, the germen turns to a roundish fruit the size of a large Pea, divided into four cells, each containing one oblong oval seed.

This tree is propagated by seeds, which must be procured from the country where it grows naturally, and should be fresh, otherwise they will not grow. When they are gathered from the tree, they should be put up in sand to preserve them, for when they are sent over in papers, the insects naturally devour them. These seeds must be sown in pots filled with light earth as soon as they arrive, and plunged into the tan. If it should happen in autumn or winter, they must be plunged in the stove, but in spring or summer, they may be plunged in the tan-bed under a frame; they should be taken out of their covers, otherwise they will be long in the ground before they vegetate. When the plants come up and are fit to remove, they should be carefully transplanted, each into a separate pot, and plunged into a good hot-bed of tanners bark, shading them from the sun till they have taken new root; after which they should be treated in the same way as the Coffee-tree, with which management the plants will succeed.

TOMENTUM is that soft downy substance which grows on the leaves of some plants.

TORDYLIUM. Tourn. Inst. R. H. 320. tab. 170. Lin. Gen. Plant. 293. Hartwort.

The CHARACTERS are,

It hath an umbellated flower; the principal umbel is composed of many small ones, which are compounded of many rays; the involucre of the greater umbel is composed of narrow leaves, and is frequently as long as the rays of the umbel; those of the rays are half the length; the umbels are diffused. The flowers have five heart-shaped inflexed petals which are equal; they have each five hair-like stamina terminated by single summits, and a roundish germen situated under the flower, supporting two small styles, crowned by obtuse stigmas. The germen afterward turn to a roundish compressed fruit longitudinally indented, dividing in two parts, each containing one roundish compressed seed with an indented border.

This genus of plants is ranged in the second section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. **TORDYLIUM (Maximum)** umbellis confertis radiatis, foliolis lanceolatis inciso-ferratis. Hort. Cliff. 90. *Hartwort with the rays of the umbel closed together, and the lobe of the leaves spear-shaped, and cut like saws. Tordylium maximum. Tourn. Inst. R. H. 320. The greatest Hartwort.*
2. **TORDYLIUM (Officinale)** involucris partialibus longitudine florum, foliolis ovatis laciniatis. Hort. Cliff.

90. *Hartwort with the involucres of the rays as long as the flowers, and oval jagged leaves. Tordylium Narbonense minus. Tourn. Inst. 320. Small Hartwort of Narbonne.*

3. **TORDYLIUM (Syriacum)** involucris umbellâ longioribus. Hort. Cliff. 90. *Hartwort with longer involucres to the umbels. Tordylium minus, limbo granulato Syriacum. Mor. Umb. 37. Smaller Syrian Hartwort, with the borders of the seeds granulated.*
4. **TORDYLIUM (Apulum)** umbellulis remotis, foliis pinnatis, pinnis subrotundis laciniatis. Hort. Cliff. 90. *Hartwort with the umbels growing at a distance, and winged leaves having roundish lobes, which are cut on their edges. Tordylium Apulum minimum. Col. Ecph. 122. The least Hartwort of Apulia.*
5. **TORDYLIUM (Secacul)** umbellulis remotis, foliis duplicato-pinnatis, pinnis incisissimis tomentosis. *Hartwort whose umbels are distant from each other, and doubly-winged leaves whose lobes are cut and downy. Tordylium Orientale, Secacul Arabum dictum. Rawvolfio. Nissol. Eastern Hartwort, by the Arabians called Secacul.*
6. **TORDYLIUM (Nodosum)** umbellis simplicibus sessilibus, feminibus exterioribus hispidis. Lin. Gen. Plant. 240. *Hartwort with single umbels to the stalks, and the outer side of the seeds prickly. Caulis nodosus echinato femine. C. B. P. Knotted Parsley.*
7. **TORDYLIUM (Anthriscus)** umbellis confertis, foliolis ovato-lanceolatis pinnatifidis. Hort. Cliff. 90. *Hartwort with closed umbels, and oval, spear-shaped, wing-pointed lobes. Caulis femine aspero, flosculis rubentibus. C. B. P. Hedge Parsley with a rough seed, and a reddish flower.*
8. **TORDYLIUM (Latifolium)** umbellis confertis nudiusculis, foliis pinnatis, foliolis lanceolatis inciso-ferratis. Lin. Sp. Plant. 345. *Hartwort with naked umbels of flowers, and winged leaves whose lobes are spear-shaped and sawed. Caulis arvensis echinata latifolia. C. B. P. 152. Broad-leaved wild Parsley with rough seeds.*

The first sort grows in Italy and Spain; this is a biennial plant, which dies soon after it has perfected its seeds. The lower leaves of this sort are large and winged, each having three or four pair of lobes terminated by an odd one. The lobes are about three inches long, and one broad in the middle; they are rough and hairy, having many deep indentures on their edges like the teeth of a saw; the stalk rises three or four feet high, sending out two or three branches from the side, garnished at each joint by one winged leaf; those on the lower part of the stalk have two pair of small lobes terminated by an odd one, but those toward the top have one pair, and the middle lobe is long and narrow. The stalk and branches are terminated by umbels of white flowers, whose rays are closed together; these are succeeded by oval compressed seeds, having a thick white border. It flowers in June and July, and the seeds ripen in August or September.

The second sort grows plentifully about Rome, and also in the south of France; this is mentioned in the last edition of Ray's Synopsis as an English plant, growing naturally in Oxfordshire, where I have found it growing on the side of banks; but the seeds were sown there by Mr. Jacob Bobart, gardener at Oxford. The leaves of this sort are composed of three or four pair of oval lobes terminated by an odd one; they are soft and hairy, about one inch long, and three quarters broad, bluntly indented on their edges. The stalks rise a foot and a half high, and divide into three or four branches; these have one small leaf at each joint, and are terminated by umbels of white flowers, composed of several small umbels or rays, which stand upon long foot-stalks, spreading out wide from each other. The flowers are succeeded by smaller compressed seeds which are bordered.

The third sort grows naturally in Syria; this is a low plant, whose stalks seldom rise a foot high. The lower leaves are composed of two pair of oval lobes terminated by a large one; these are hairy, and slightly crenated on their edges; they branch out into two

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or three divisions, and are terminated by umbels of white flowers which have large involucrum, for the most part trifid. The points are spear-shaped, and at their base is situated a small umbel, composed of a few flowers sitting close to the tails of the involucrum. The flowers are succeeded by large, oval, compressed, bordered seeds.

The fourth sort grows naturally in Italy. The stalks of this branch out from the bottom, and seldom rise a foot high; they are hairy and rough. The lower leaves are composed of three pair of roundish lobes, terminated by an odd one, which are hairy and jagged. The general umbel is composed of eight small ones, which stand upon very long foot-stalks, and spread out wide from each other. The flowers are white, and the exterior petal of each is much larger than those of the two first sorts; these are succeeded by roundish, compressed, bordered seeds.

The fifth sort grows naturally about Aleppo, and in other parts of Syria. The bottom leaves are doubly winged, each leaf being composed of four pair of wings terminated by an odd one. The wings are composed of seven oval lobes standing alternately, which are deeply jagged; they are of a yellowish green colour, and a little hairy. The stalks are taper, and not channelled; they rise two feet and a half high, have a few small hairs scattered over them, and at each joint are garnished with one smaller winged leaf; they send out one or two short branches toward the top, and are terminated by large umbels of yellow flowers, composed of ten small umbels, whose foot-stalks are alternately longer; these spread open wide from each other. The flowers are succeeded by compressed oval seeds, shaped like those of Parsneps, of a yellowish colour.

The sixth sort grows naturally in arable land in several of the maritime counties in England, so is rarely admitted into gardens; this has trailing stalks which spread flat on the ground, and are a foot or more in length. The leaves are like those of Parsley, but are cut into finer segments; the umbels of flowers are small, and sit close to the joints of the stalks; the flowers are small and white; they are succeeded by short seeds a little compressed, and set with sharp burry prickles on their outside.

The seventh sort grows naturally on the side of banks and foot-paths in many parts of England; this rises with a slender stalk three feet high. The leaves are like those of Parsley; their lobes are spear-shaped, and have winged points; they are hairy, and stand thinly on the stalks. The flowers are produced in small umbels at the top of the stalks, which are composed of several small umbels or rays which close together; they are small, and of a pale red colour, and are succeeded by small prickly seeds.

The eighth sort grows naturally among the Corn in Cambridgeshire, and in some other parts of England. This rises with a channelled stalk three feet high, garnished with one winged leaf at each joint, composed of two pair of lobes terminated by a long one: they are broad, spear-shaped, and deeply sawed on their edges. The umbels of flowers which terminate the stalks are clustered together; the seeds are broad, rough, and have borders round them.

All these plants may be termed annual, because they do not live more than one year; but some of them are called biennial, from the young plants which come up in autumn living through the winter, and producing their flowers and fruit the following summer; but as the seeds which are sown or permitted to scatter, perfect their seeds in the compass of one year, they should be termed annual, for this is the property of many of the plants with umbellated flowers, whose seeds should be sown in autumn; otherwise, if they come up (which frequently does not happen the same year when they are sown in the spring,) the plants generally decay before their seeds ripen; but as their whole growth is performed within the year, they are esteemed as annual plants.

They are propagated by seeds, which should be sown

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in autumn soon after they are ripe, when the plants will soon appear, and are very hardy, so that they require no farther care but to keep them clear from weeds, and where they come up too close together, they should be thinned, so as to leave them six inches asunder. In June following the plants will flower, and their seeds will ripen in August, which, if permitted to scatter on the ground, will produce a supply of plants without any trouble. If the seeds of these plants are kept out of the ground till spring, they seldom succeed; for if any plants are produced from the seeds then sown, they commonly perish before they have perfected their seeds, whereas those which are sown in autumn rarely fail. These plants will grow on any soil or situation, so may be put into any obscure part of the garden.

TORMENTILLA. Tourn. Inst. R. H. 298. tab. 153. Lin. Gen. Plant. 153. Tormentil.

The CHARACTERS are,

The flower has a plain empalement of one leaf, divided into eight segments at the top; it has four oval heart-shaped petals, whose tails are inserted in the empalement, and spread open, and many awl-shaped stamina which are inserted in the empalement, terminated by single summits; it has eight small germen collected in a head, which have slender styles the length of the germen inserted to their sides, crowned by obtuse stigmas. The germen afterward turns to a fruit, containing many small seeds included in the empalement.

This genus of plants is ranged in the fifth section of Linnæus's twelfth class, which includes those plants whose flowers have from twelve to twenty stamina, which are inserted in the empalement.

The SPECIES are,

1. TORMENTILLA (*Erecta*) caule erecto. Lin. Sp. Plant. 500. Tormentil with an erect stalk. Tormentilla vulgaris. Park. Theat. 394. Common Tormentil.
2. TORMENTILLA (*Reptans*) caule repente, foliis petiolatis. Lin. Sp. Plant. 500. Tormentil with a creeping stalk, and leaves on foot-stalks. Pentaphyllum reptans, alatum, foliis profundius serratis. D. Plot. Oxf. 6. 1. 7. tab. 9. Creeping winged Cinquefoil, with leaves which are deeply sawed.

The first sort grows wild on dry pastures and commons in most parts of England, so is never cultivated in gardens; this is so commonly known as to need no description. The roots of this plant have been frequently used for tanning of leather, in places where Oak bark is scarce. This root is also much used in medicine, and is accounted the best astringent in the whole vegetable kingdom.

The second sort is found in some particular places of England growing wild, but particularly in Oxfordshire. The stalks of this sort spread on the ground, and emit roots from their joints, whereby they propagate very fast: this is rarely preserved, unless in some botanic gardens for the sake of variety. It requires no care to propagate these plants, since, if their roots are once planted in almost any soil or situation, the plants will flourish without any other care, but to prevent their being over-run with great weeds.

TOURNEFORTIA. Lin. Gen. Plant. 176. Pittonia. Plum. Nov. Gen. 5. tab. 3.

The CHARACTERS are,

The empalement of the flower is of one leaf, cut into five small segments at the top, and is permanent. The flower is of one petal, of the globular bell-shape, and cut at the brim into five acute points, which spread open horizontally; it has five awl-shaped stamina the length of the tube, terminated by single summits, and a globular germen supporting a single style the length of the stamina, crowned by a single stigma. The germen afterward becomes a spherical succulent berry, inclosing four oblong oval seeds resting upon the empalement.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

Father Plumier, who discovered several species of this genus in America, constituted this genus, and gave it the title of Pittonia, in honour of Dr. Joseph Pitton;

but

but Dr. Linnæus has changed the title from Pittonia to Tournefortia.

The SPECIES are,

1. TOURNEFORTIA (*Fœtidissima*) foliis ovato-lanceolatis, hirtis pedunculis ramosis spicis pendulis. Lin. Sp. 201. *Tournefortia* with oval, spear-shaped, hairy leaves, and hanging spikes of flowers. Pittonia racemosa nicotianæ foliis fœtidissimis. Plum. Gen. Nov. 5. *Branching Pittonia* with fœtid Tobacco leaves.
2. TOURNEFORTIA (*Hirsutissima*) foliis ovatis petiolatis, caule hirsuto, spicis ramosissimis terminalibus. Lin. Sp. Plant. 140. *Tournefortia* with oval leaves growing upon foot-stalks, and a hairy stalk terminated by very branching spikes of flowers. Pittonia hirsutissima & ramosissima, baccis albis. Plum. Gen. Nov. 5. *The most branching hairy Pittonia* with white berries.
3. TOURNEFORTIA (*Volubilis*) foliis ovatis acuminatis, glabris petiolis reflexis, caule volubili. Lin. Sp. Plant. 143. *Tournefortia* with oval, acute-pointed, smooth leaves, having reflexed foot-stalks and a twining stalk. Pittonia scandens, baccis niveis, nigris maculis notatis. Plum. Gen. 5. *Climbing Pittonia*, with white berries marked with black spots.
4. TOURNEFORTIA (*Scandens*) foliis cordatis hirsutis, spicis racemosis reflexis, caule volubili. *Tournefortia* with hairy heart-shaped leaves, branching reflexed spikes of flowers, and a twining stalk. Pittonia scandens racemosa, flore fusco. Houst. MSS. *Climbing branching Pittonia*, with flowers of a brown colour.
5. TOURNEFORTIA (*Tomentosa*) foliis cordatis subtus tomentosis, spicis racemosis brevibus, caule volubili. *Tournefortia* with heart-shaped leaves which are woolly on their under side, very short branching spikes of flowers, and a twining stalk. Pittonia scandens, racemosa, foliis subrotundis subtus incanis. Houst. MSS. *Climbing branching Pittonia*, with roundish leaves which are hoary on their under side.
6. TOURNEFORTIA (*Carnosa*) foliis ovatis rugosis petiolatis, spicis racemosis axillaribus, caule fruticoso. *Tournefortia* with oval rough leaves growing upon foot-stalks, branching spikes of flowers proceeding from the wings of the stalks, and a shrubby stalk. Pittonia frutescens, folio carnosa hirsuta & obtusa. Plum. Gen. 5. *Shrubby Pittonia* with a fleshy, hairy, and blunt leaf.
7. TOURNEFORTIA (*Suffruticosa*) foliis sub-lanceolatis incanis suffruticoso. Lin. Sp. 202. *Tournefortia* with oval spear-shaped leaves having acute points, being woolly on their under side, branching incurved spikes of flowers, and a branching stalk.
8. TOURNEFORTIA (*Humilis*) foliis lanceolatis sessilibus, spicis simplicibus recurvis lateralibus. Lin. Sp. Plant. 141. *Tournefortia* with spear-shaped leaves sitting close to the stalks, and single recurved spikes of flowers growing at the wings of the same. Pittonia humilis anchusæ folio. Plum. Gen. 5. *Low Pittonia* with an Alkanet leaf.

The first sort grows naturally in Jamaica, and in some of the other islands in the West-Indies, where it rises with shrubby stalks ten or twelve feet high, sending out many branches, which are closely garnished with oval spear-shaped leaves placed alternately round the stalks; they are five inches long, and two and a half broad in the middle, hairy on their under side, and stand upon short foot-stalks. The branches are terminated by long branching spikes of flowers, which are ranged on one side the foot-stalks in the same manner as those of the Heliotrope or Turnsol. Some of the foot-stalks sustain two, others three, and some four spikes of flowers, which are near five inches long, and are reflexed like a scorpion's tail at the top. The flowers are of a dirty white colour; they are small, and closely ranged on one side the spike; these are succeeded by small succulent fruit, inclosing four oblong seeds in each.

The second sort is also a native of the islands in the West-Indies. The stalks of this are shrubby, taper, and rough; they rise to the height of eight or ten feet, dividing into many branches, which are covered with a light brown, hairy, rough bark, and garnished with oval leaves placed alternately; these are about

four inches long, and two and a half broad, having many transverse veins running from the midrib to the sides; they have short hairy foot-stalks, and are of a deep green on their upper side. The branches are terminated by very branchy spikes of flowers; these are succeeded by small, roundish, succulent fruit, each inclosing four oblong seeds.

The third sort grows naturally in Jamaica, and some of the islands in America; this has a twining ligneous stalk, which twists about the neighbouring trees for support, and rises to the height of ten or twelve feet, sending out several slender ligneous branches, which are garnished with oval acute-pointed leaves, whose foot-stalks are reflexed. The flowers are produced in branching spikes from the side and the top of the branches; they are small and white, and are succeeded by small, white, succulent berries, having one or two black spots on each.

The fourth sort was discovered by the late Dr. Houftoun, growing naturally in Jamaica, who sent the seeds to England; this hath shrubby branching stalks, which rise to the height of ten or twelve feet. The branches are garnished with heart-shaped hairy leaves, near three inches long, and one and a half broad near the base, ending in acute points; they are of a thinner texture than those of the former species, and stand upon short foot-stalks. The flowers come out at the end of the branches in very slender branching spikes; they are small, and of a dirty brown colour, ranged along on the upper side of the foot-stalk; these are succeeded by small pulpy berries, each containing four seeds.

The fifth sort was found growing naturally by Mr. Robert Millar near Carthagen, in New Spain; this has climbing stalks, which twine about any neighbouring support, and rise to the height of ten or twelve feet. The branches are garnished with heart-shaped leaves which are two inches long, and one and a quarter broad near their base; they are very downy on their under side, and stand upon very short foot-stalks. The flowers are produced in short branching spikes which come out from the wings of the branches; they are of a dirty white colour, small, and are succeeded by small succulent berries, inclosing two, three, and sometimes four seeds.

The sixth sort was discovered by the late Mr. Robert Millar, growing naturally near Carthagen in New Spain; this has a strong ligneous stalk, which rises near twenty feet high, sending out several strong ligneous branches, covered with a light brown bark which is rough, and garnished with thick oval leaves, four inches long and three broad; they are very rough on their upper surface, and of a dark green colour, but pale and smoother on their under side, standing upon pretty long foot-stalks. The flowers are produced in branching spikes from the wings of the branches; they are small, white, and shaped like those of the other species, and are succeeded by small succulent berries, each including two or three oblong seeds. The seventh sort was discovered by the same gentleman in the same country; this has woody stalks which rise five or six feet high, from which spring out many slender ligneous branches, garnished with oval spear-shaped leaves about two inches long, and one broad in the middle, which are rounded at each end, but have acute points; they are of a dark green on their upper surface, but have a white down on their under side, and sit close to the branches. The flowers are produced from the wings of the stalks, and also at the top; they are formed in slender branching spikes, being ranged on one side of the spikes which are recurved; they are white, and are succeeded by small succulent berries, which contain two or three seeds.

The eighth sort was found growing naturally at Campeachy, by the late Dr. Houftoun; this plant has low shrubby stalks, which seldom rise more than three feet high, sending out a few slender ligneous branches, which are garnished with rough spear-shaped leaves sitting close to the branches; these are of a dark green on their upper side, but pale on their under. The

flowers come out in single spikes from the wings of the stalk; they are white, and are succeeded by small succulent berries like the former sort.

These plants are propagated by seeds, which must be procured from the countries where they grow naturally; these should be sown in small pots filled with light earth, and plunged into a hot-bed of tanners bark. These seeds sometimes grow the first year, but they often remain in the ground a whole year; therefore, if the plants should not come up the same season, the pots should be plunged in autumn into the tan-bed in the stove, where they should remain all the winter, and in the spring they should be removed out, and plunged into a fresh tan-bed, which will soon bring up the plants if the seeds were good. When these are fit to remove, they should be each planted in a small pot, and plunged into a tan-bed, where they must be shaded from the sun till they have taken new root, and then they must be treated in the same way as other tender plants from the same countries, which require to be kept constantly in the bark-stove.

TOXICODENDRON. Tourn. Inst. R. H. 610. tab. 381. Rhus. Lin. Gen. Plant. 331. [τοξικόν, poison, and δένδρον, a tree.] Poison-tree, vulgò.

The CHARACTERS are,

The male flowers are upon different plants from the female; they have a small empalement cut into five points at the brim, and five small roundish petals which spread open; they have five short stamina, terminated by roundish summits. The female flowers have empalements and petals like the male; they have no stamina, but in the center is situated a roundish germen, supporting three small styles, crowned with globular stigmas. The germen afterward turns to a berry with one or two cells, inclosing one seed in each.

This genus of plants is ranged in the third section of Linnæus's fifth class, which includes the plants whose flowers have five stamina and three styles, and has joined them to his genus of Rhus; but this genus should be ranged in the fifth section of his twenty-second class, which contains those plants whose flowers are male and female on different plants, and the male flowers have five stamina.

The SPECIES are,

1. **TOXICODENDRON (Vulgare)** foliis ternatis, foliolis obcordatis, glabris, integerrimis, caule radicante. *Poison-tree with roundish, heart-shaped, smooth, entire, trifoliate leaves, and a stalk putting out roots.* Toxicodendron triphyllum, folio sinuato pubescente. Tourn. Inst. 611. *Smooth three-leaved Poison-tree, or Poison Oak.*
2. **TOXICODENDRON (Pubescens)** foliis ternatis, foliolis ovatis inciso-angulatis pubescentibus. *Poison-tree with trifoliate leaves whose lobes are oval, angularly cut, and covered with short soft hairs.* Toxicodendron triphyllum, glabrum. Tourn. Inst. 611. *The three-leaved Poison-tree, with a soft, hairy, sinuated leaf.*
3. **TOXICODENDRON (Glabrum)** foliis ternatis, foliolis ovato-lanceolatis glabris caule erecto fruticoso. *Poison-tree with trifoliate leaves whose lobes are oval, spear-shaped, and smooth, and an erect shrubby stalk.* Toxicodendron rectum, foliis minoribus glabris. Hort. Elth. 389. *Upright Poison-tree with smaller smooth leaves.*
4. **TOXICODENDRON (Pinnatis)** foliis pinnatis, foliolis ovato-lanceolatis integerrimis. *Poison-tree with winged leaves whose lobes are oval, spear-shaped, and entire.* Toxicodendron foliis alatis, fructu rhomboide. Hort. Elth. 392. *Poison-tree with winged leaves and a rhomboidal fruit, called Poison Ash.* And the Rhus foliis pinnatis integerrimis, petiolo integro æquali. Lin. Mat. Med. 151. Also the Amyris foliis impari pinnatis of the same author. Sp. Plant. 496.
5. **TOXICODENDRON (Crenatum)** foliis ternatis, foliolis ovatis crenato-dentatis glabris. *Poison-tree with trifoliate leaves, whose lobes are oval, smooth, and bluntly indented.*
6. **TOXICODENDRON (Volubilis)** foliis ternatis, foliolis ovatis inciso-sinuatis glabris, caule volubili radicante. *Poison-tree with trifoliate leaves whose lobes are oval,*

smooth, and cut into sinuses, and a twining rooting stalk. Toxicodendron amplexicaule, foliis minoribus glabris. Hort. Elth. 399. *Poison-tree with a twining stalk, and smaller smooth leaves.*

7. **TOXICODENDRON (Serratum)** foliis sæpius ternatis, foliolis oblongo-ovatis rugosis serratis, caule radicante. *Poison-tree with leaves which are generally trifoliate, oblong, oval, rough, sawed lobes, and a rooting stalk.*
8. **TOXICODENDRON (Arboreo)** foliis ternatis, foliolis lanceolatis supernè inæqualiter serratis, subtus tomentosis, caule arborecente. *Poison-tree with trifoliate leaves, spear-shaped lobes unequally sawed toward their points, downy on their under side, and a tree-like stalk.* Baccifera Indica trifoliata, fructu rotundo monopyreno, pedunculo longo. Sloan. Cat. 170. *Indian, trifoliate, berry-bearing-tree, with a roundish fruit having one seed, and a long foot-stalk.*
9. **TOXICODENDRON (Arborecens)** foliis ternatis, foliolis ovato-lanceolatis acuminatis glabris, caule fruticoso ramoso. *Poison-tree with trifoliate leaves, having oval, spear-shaped, acute-pointed, smooth lobes, and a shrubby branching stalk.* Toxicodendron arborecens pyri foliis glabris, floribus racemosis. Houst. MSS. *Tree-like Poison-tree, with smooth Pear leaves and branching flowers.*
10. **TOXICODENDRON (Altissimum)** foliis pinnatis sessilibus, lobis acuminatis. *The tallest Poison-tree with winged leaves, whose lobes are pointed, and sit close to the foot-stalks.* Fasi no Ki. Arbor Vernicifera spuria, sylvestris angustifolia. Kemp. Amœn. 794. *The spurious Vernice-tree with narrow leaves.*

The first sort grows naturally in many parts of North America; this has a low shrubby stalk, which seldom rises more than three feet high, sending out shoots near the bottom, which trail upon the ground, putting out roots from their joints, whereby it multiplies and spreads greatly; so that when it is not confined or trained up to a support, the stalks seldom rise upward. If the stalks happen to be close to a wall, they emit roots which fasten to the joints in the wall, and support themselves when they are severed from the root; and the stalks of such plants will become more ligneous, and rise much higher, than those which grow in the ground. The foot-stalks of the leaves are near a foot long; the leaves are composed of three oval heart-shaped lobes, which are smooth and entire, each lobe standing upon short foot-stalks; the lobes are five inches long, and three inches and a half broad; the two side lobes are oblique to the foot-stalk, but the middle one is equal; they have many transverse veins running from the midrib to the borders. The flowers come out from the side of the stalk in loose panicles; they are of an herbaceous colour and small, so make little appearance. Some plants have only male flowers, which have five stamina in each; these decay without producing fruit, but upon the other plants are only female flowers, which have a germen and three very short styles; these are succeeded by roundish, channelled, smooth berries of a gray colour, which inclose one or two seeds, but these seeds do not grow unless some male plants are near them. The plants flower in July, and the seeds ripen in autumn. This plant, whence once planted in a garden, will propagate fast enough by its trailing branches, which put out roots at every part. It will thrive in almost any soil or situation.

The second sort grows naturally in many parts of North America. The stalks of this sort rise higher than those of the former; the branches are slender but ligneous; they have a brown bark, and are garnished with downy leaves standing upon pretty long foot-stalks; these are composed of three oval lobes about two inches long, and one and a half broad, indented angularly, and are hoary on their under side. The male flowers, which are produced on separate plants from the fruit, come out from the side of the stalks in close short spikes; these are of an herbaceous colour, and have five short stamina in each. The female flowers are produced in loose panicles; these are

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in shape and colour like the male, but are larger, and have a roundish germen, supporting three very short styles; these are succeeded by roundish berries which ripen in autumn.

The third sort grows naturally in North America; this has a shrubby branching stalk which rises six or seven feet high, covered with a brown bark. The branches are ligneous, and grow erect; they are garnished with smooth trifoliate leaves, whose lobes are oval, spear-shaped, and have a few small indentures on their borders; they are near three inches long, and one and a half broad, with several transverse veins from the midrib to their borders. The male and female flowers grow upon separate plants; their shape and colour is like those of the former, and the fruit is also like that.

The fourth sort grows naturally in Virginia, Pennsylvania, New England, and Carolina; from all these countries I have received seeds and plants of it, and it also grows in Japan. This, in the countries where it grows naturally, rises with a strong woody stalk to the height of twenty feet or upward, but in England we seldom see any of them more than five or six feet high; the reason of this is from the plants being tender, so are destroyed in severe winters; but I have seen some plants which were kept in pots and sheltered in winter, upward of ten feet high, in the garden of Samuel Reynardson, Esq; at Hillendon, which, after his death were purchased, with all his other exotic plants, by Sir Robert Walpole. This has a strong woody stalk, covered with a light brown bark inclining to gray, branching out on every side. The branches are garnished with winged leaves, composed of two or three pair of lobes terminated by an odd one. The lobes vary greatly in their shape, but for the most part they are spear-shaped, about three or four inches long, and one and a half broad in the middle; they are sometimes rounded at their base, but end in acute points; their upper surface is smooth, and of a lucid green, but their under side is pale and a little hairy. The foot-stalks of the leaves change to a bright purple colour, especially toward the latter part of summer, and in autumn all the leaves are of a beautiful purple colour before they fall off. The male flowers are produced in loose panicles from the wings of the branches; they are small, of an herbaceous white colour, composed of five small roundish petals, and have five short stamina within, terminated by roundish summits. The female flowers are upon separate plants from the male, and are disposed on loose panicles; these are shaped like the male, but are somewhat larger, and have in their center a roundish germen, supporting three very short styles, crowned with globular stigmas. The germen afterward turns to a berry variable in shape, sometimes almost oval, at others shaped like a small spear; but the most general form is roundish, with a protuberance almost like the Cicer; these include one seed. It flowers in July, and in warm seasons the female plants produce fruit, but they do not ripen here.

This is undoubtedly the same plant which is mentioned by Dr. Kempfer in his *Amœnitates Exoticarum*, by the title of *Sitz*, vel *Sits Adju*, or *Arbor vernicifera legitima*, folio pinnato juglandis, fructu racemosa Ciceris facie, p. 791, 792. The true Varnish-tree with a Walnut-tree leaf, and a branching fruit like Cicers. But the figure he has exhibited of this plant, is the most inaccurate of any perhaps to be found in any of the modern books of botany; it is drawn from a side shoot of a branch which has been cut off, so has neither flower nor fruit to it, and being a vigorous shoot, the leaves are very different in size and shape from those on plants which have not been headed; and his description of the leaves seems to have been taken from this branch, otherwise he could not have compared them to those of the Walnut-tree. He seems to have been conscious of this fault, by his adding another figure of the plant in small under his own, taken from a Japan Herbal, in

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which there is a much better representation of it than his own conveys. How a person, who was employing himself in making drawings of plants, in a country where the natural history of it was so little known, should make choice of such an imperfect sample for his figure, is amazing; for there can be no doubt of his meeting with perfect plants in flower or fruit, in a place where the shrubs are cultivated so plentifully as he mentions; and in his description of it, he sets out by comparing the height of the shrubs to those of Willow, than which he could not have chosen any plant by way of comparison, which would have conveyed a more indetermined idea; for it is well known there are different species of Willow, whose growth is from four to forty feet high; therefore there can be no other way of reconciling his description with what he afterward mentions, when he is giving an account of the method used by the natives in collecting the varnish, where he says the shrubs are cut down every third year, but by comparing their growth with that of the Willows, which are cut down for fuel, &c. every four or five years.

However, as the dried samples of this plant which he brought to Europe, agrees with the American *Toxicodendron* here mentioned, and the milky juice of both have the same qualities of staining, so there can be no doubt of the plants being the same; therefore if it is thought that varnish may be of public utility, it may be collected in plenty in most of the English settlements in North America.

Kempfer has also given a figure and description of a spurious Varnish-tree, which is called *Fasi-no-Ki* by the natives, and is by him titled *Arbor vernicifera spuria*, *sylvestris angustifolia*. Spurious wild Varnish-tree with a narrow leaf, which he says agrees with the other in every part, excepting the lobes of the leaves, which are narrower. This led me into a mistake in the former editions of the *Gardeners Dictionary*, by supposing their difference might arise from culture only; but having since raised from seeds a shrub which has all the appearance of his spurious Varnish-tree, and is evidently a distinct species, if not a different genus from the true sort, I am certain Kempfer has been guilty of a great mistake in this particular. The seeds of this were sent from China, for those of the Varnish-tree; but when I sowed them, I remarked they were pretty much like those of the Beech-tree, but smaller, being thick on one side and narrow on the other, in shape of a wedge, from whence I supposed there were three of the seeds included in one capsule. There is a shrub of this kind now growing in the Chelsea Garden, which is more than twenty feet high, but, as it has not yet produced flowers, I am at a loss where to range it, therefore have placed it here till it has shewn its flowers. How Dr. Linnæus came to change the title of this plant, and remove it to another class, I am at a loss to account; for had he seen the plants growing, or had specimens of it, I am certain he would not have done: for though sometimes, in very vigorous growing plants, the flowers have frequently six or seven stamina, yet their constant number is rarely more than five: and how some other persons, from whom he had this intelligence, has supposed the true Varnish-tree and the wild one were the same, I am at as great a loss to guess; for the leaves of the true Varnish-tree has seldom more than four pair of lobes, but the wild sort has fourteen or sixteen pair, and the lobes are differently formed.

The fifth sort grows naturally in North America, from whence the seeds were a few years since brought to England; this has a shrubby stalk which sends out many ligneous branches, covered with a smooth purple bark, and garnished with trifoliate leaves, standing upon foot-stalks an inch long; the lobes are oval, about two inches long, and one and a half broad in the middle, of a deep lucid green on their upper side, but of a pale green on their under, and are deeply crenated or indented on their edges, their base joining

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joining close to the foot-stalks. The leaves, when bruised, emit an odour like that of Orange-peel, from whence the gardeners have titled it the sweet-scented Toxicodendron. The male flowers are produced in short close panicles; they are small, and of an herbaceous white colour; they grow upon separate plants from the fruit, which grow in sparfed panicles, and are of an oval shape.

The sixth sort grows naturally in North America. The stalks of this sort emit roots their whole length, whereby they fasten to trees or any neighbouring support, and climb to the height of six or eight feet; these are garnished with trifoliate oval leaves, which are smooth, and cut into sinuses on their edges. The lobes are four inches long and two broad. The flowers are produced in short panicles from the side of the branches; they are male and female on different plants like the other species.

The seventh sort was sent me by Mr. John Bartram from Philadelphia, by the title of Great Toxicodendron; this hath trailing roots which run near the surface of the ground, sending up stalks in different places; the leaves stand upon long foot-stalks; they have chiefly three lobes, but some have four. The lobes are obtuse, rough, and sawed on their edges. They are four or five inches long, and three broad; this sort has not as yet flowered in England, so I can give no farther description of the plant at present: these sorts are all of them so hardy as to thrive in the open air in England, but the fourth sort is often destroyed by severe frost, so should be planted in a warm situation.

The first, sixth, and seventh sorts propagate in plenty by their creeping stalks and roots; the others are propagated by laying down their branches, which will put out roots in one year, and may then be taken off and transplanted, either in the places where they are to remain, or in a nursery, to grow two or three years to get strength before they are planted out for good; they are also propagated by seeds, which should be sown on a bed of light earth, and when the plants come up they must be kept clean from weeds the following summer; and before the frost comes on in autumn, the bed should be hooped over, that the plants may be covered with mats, for otherwise the early frosts will kill their tops, which frequently causes their stalks to decay to the ground; for as the plants are tender, and generally shoot late the first year, they are in much greater danger than when they get more strength. In spring the plants may be transplanted into nursery-beds to grow a year or two, and may then be transplanted for good.

These plants are preserved by the curious in botany for the sake of variety, but as there is little beauty in them, there are not many of the sorts cultivated in in England. The wood of these trees, when burnt, emits a noxious fume, which will suffocate animals when they are shut up in a room where it is burnt: an instance of this is mentioned in the Philosophical Transactions by Dr. William Sherard, which was communicated to him in a letter from New England by Mr. Moore, in which he mentions some people who had cut some of this wood for fuel, which they were burning, and in a short time they lost the use of their limbs, and became stupid; so that if a neighbour had not accidentally opened the door, and seen them in that condition, it is generally believed they would soon have perished. This should caution people from making use of this wood for such purpose.

When a person is poisoned by handling this wood, in a few hours he feels an itching pain, which provokes a scratching, which is followed by an inflammation and swelling. Sometimes a person has had his legs poisoned, which have run with water. Some of the inhabitants of America affirm, they can distinguish this wood by the touch in the dark, from its extreme coldness, which is like ice; but what is mentioned of this poisonous quality, is most applicable to the fourth sort here mentioned, which, by the description, agrees with this species.

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The juice of the tree is milky when it first issues out of the wounded part, but soon after it is exposed to the air it turns black, and has a very strong foetid scent, and is corroding; for I have observed, on cutting off a small branch from one of these shrubs, that the blade of the knife has been changed black in a moment's time, so far as the juice had spread over it, which I could not get off without grinding the knife. The eighth sort grows naturally in Jamaica on the red hills, and Campeachy, in great plenty. It has a thick woody stem which rises near thirty feet high, with a smooth Ash-coloured bark, sending out ligneous branches on every side, which have a hairy rusty-coloured bark, and are garnished with trifoliate leaves which have hairy foot-stalks two inches long. The lobes are spear-shaped, about four inches long, and two broad in the middle, drawing to points at both ends; they are unequally sawed toward the top, and have many transverse veins running from the midrib to the borders; they are of a dark green on their upper side, but have a brown woolly down on their under side. The flowers are ranged in a single racemus, which springs from the wings of the branches; they are small, of a yellowish colour, and the female flowers are succeeded by small, oval, smooth berries, of an Orange colour when ripe.

The ninth sort grows naturally about Carthagena in New Spain; this rises with a shrubby stalk twelve or fourteen feet high, covered with a gray bark, sending out a great number of branches on every side, which are garnished with trifoliate smooth leaves, whose lobes are oval, spear-shaped, and oblique to their foot-stalks; they are near three inches long, and an inch and a half broad, running out in long acute points. The male and female flowers are upon different plants; they are formed in loose panicles, are small, and of a dirty white colour. The female flowers are succeeded by small, oval, smooth berries, each including one seed.

The two last sorts are tender plants, so will not thrive in this country without the assistance of artificial heat; they are propagated by seeds, when these can be procured from the countries where the plants grow naturally. These should be sown as soon as they arrive here, in pots filled with light earth, and plunged into a tan-bed. Sometimes the plants will come up the same year, but the seeds often lie long in the ground when they are sown in the spring; and when they do not grow the first year the pots should be plunged in the bark-bed in the stove in autumn, where they should be plunged into a fresh hot-bed under a frame, which will soon bring up the plants. When these are fit to remove, they should be each planted in a small pot filled with light earth, and plunged into a new tan-bed, observing to shade them from the sun till they have taken new root; then they should be treated in the same way as other tender exotic plants, which are constantly kept in the bark-stove.

The tenth sort came from China. This grows to a large size, sending out many branches on every side, which are garnished with very long winged leaves, each leaf having fourteen or sixteen pair of lobes, which sit close to the midrib; as this has not produced flowers in England, so we are at a loss where to place it, but it is hardy enough to live in the open air in winter. This propagates fast enough by the many suckers sent out from the roots.

TRACHELIUM. Tourn. Inst. R. H. 130. tab. 50. Lin. Gen. Plant. 204. Throatwort.

The CHARACTERS are,

The flower has a small empalement cut at the top in five parts, sitting upon the germen. It has one petal, which is funnel-shaped, having a long, slender, cylindrical tube, cut at the top into five small oval segments, which spread open; it has five hair-like stamina the length of the petal, terminated by single summits; and a roundish three-cornered germen situated under the flower, supporting a long slender style, crowned by a globular stigma. The germen afterward turns to a roundish obtuse capsule with three lobes, having three cells, which are filled with small seeds.

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This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

We know but one SPECIES of this genus in the English gardens, viz.

TRACHELIUM (*Ceruleum*.) Hort. Upsal. 41. *Throatwort*.
Trachelium azureum umbelliferum. Pon. Bal. 44.
Blue Mountain Throatwort.

This plant grows naturally in shady woods in many parts of Italy. It has a perennial root which is fleshy and tuberous, sending out many fibres which spread wide on every side. The leaves are oval, spear-shaped, about two inches long, and one broad in the middle, sawed on their edges, and ending in acute points. The stalks rise a foot and a half high, and are garnished with leaves shaped like those at the bottom, but come out irregularly. Sometimes there are two pretty large leaves, and one or two smaller rising from the same point; at others, one large and three smaller at the same joint; these come out alternate, and the upper part of the stalk, immediately under the umbel, is naked of leaves, except two or three narrow ones, which are close to the foot-stalks of the flowers; these are disposed in form of an umbel composed of many small ones. The flowers are small, funnel-shaped, and of an azure blue colour; these appear in June and July, and are succeeded by roundish capsules, with three cells filled with small seeds, which ripen in September.

This plant is propagated by seeds, which should be sown in autumn when they are ripe, for when they are kept out of the ground till spring, they frequently fail, or if they do grow, it is not before the following spring. When the plants come up, they should be kept clean from weeds, and as soon as they are big enough to remove, they should be transplanted on an east-aspected border of light undunged earth, placing them in rows six inches apart, and four inches distant in the rows, shading them from the sun till they have taken new root; after which they require no other care but to keep them clean from weeds till autumn, when they may be transplanted into the borders of the flower-garden, where they will flower the following summer.

But as these plants will thrive better on old walls, when by accident they have arisen from seeds, so their seeds, when ripe, may be scattered on such walls as are old, or where there is earth lodged sufficient to receive the seeds; where the plants will come up and resist the cold much better, and continue longer than when sown in the full ground; and when a few of the plants are established on the walls, they will shed their seeds, so that they will maintain themselves without any farther care. I have observed some plants of this kind, which have grown from the joints of a wall, where there has not been the least earth to support them, which have resisted the cold, though they have been greatly exposed to the winds, when most of those in the full ground were killed; so that these plants are very proper to cover the walls of ruins, where they will have a very good effect.

TRADESCANTIA. Lin. Gen. Plant. 398. *Ephemerum*. Tourn. Inst. 193. *Flower of a Day*, or *Virginia Spiderwort*.

The CHARACTERS are,

The empalement is composed of three oval concave leaves which are permanent. The flower has three orbicular, large, spreading petals, which are equal, and six slender hairy stamina which stand erect, and are the length of the empalement, terminated by kidney-shaped summits, with an oval germen supporting a slender three-cornered style, crowned by a three-cornered obtuse stigma. The empalement covers an oval capsule with three cells, filled with angular seeds.

This genus of plants is placed in the first section of Linnæus's sixth class, which contains those plants whose flowers have six stamina and one style.

We have but one SPECIES of this plant in England, though there are two other species, one of which

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grows on the coast of Malabar, the other in the American islands.

TRADESCANTIA (*Virginiana*) erecta lævis, floribus congestis. Lin. Sp. 411: *Virginia Spiderwort with erect smooth stalks, and flowers closely connected at the top*.

This plant grows naturally in Virginia, and most other parts of North America; it hath roots composed of many fleshy fibres; the stalks are smooth, rising a foot and a half high, garnished by long, smooth, keel-shaped leaves, which embrace the stalks; the flowers are produced in clusters at the top of the stalks; these are composed of three pretty large spreading petals of a purple colour; they appear early in June, and there is a succession of flowers most part of summer; though each flower continues but one day, from whence it had the title of *Ephemerum*.

There are two other varieties of this species, one with a deep blue, and the other a white flower; but as these vary from one to another when raised from seeds, so they should not be separated.

These plants multiply so fast by their roots, and also from the seeds if permitted to fall, that they should be yearly reduced to keep them within bounds. The best time to remove and part the roots is in the autumn.

TRAGACANTHA. Tourn. Inst. R. H. 417. tab. 234. *Astragalus*. Lin. Gen. Plant. 799. [*Τραγάκανθα*, of *Τράγος*, a goat, and *Ἀκάνθη*, a thorn.] *Goats-thorn*.

The CHARACTERS are,

The empalement of the flower is of one leaf, indented in five parts, the lower segments being the shortest. The flower is of the butterfly kind; the standard is long, erect, indented at the point, and the borders are reflexed. The wings are shorter than the standard. The keel is of the same length with the wings, and is indented; it has ten stamina, nine are joined and one is separated, terminated by roundish summits, and a short taper germen supporting an awl-shaped style, crowned by an obtuse stigma. The germen afterward becomes a short swelling pod, having two longitudinal cells, inclosing kidney-shaped seeds.

This genus of plants Dr. Linnæus has joined to the *Astragalus*, which is placed in the third section of his seventeenth class, which contains those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. TRAGACANTHA (*Massiliensis*) petiolis longioribus spinescentibus, foliolis ovatis obtusis. *Goats-thorn with longer foot-stalks ending in spines, and having oval obtuse lobes to the leaves*. Tragacantha. C. B. P. 388. *Goats-thorn*.
2. TRAGACANTHA (*Hispanica*) foliolis lanceolatis, floribus solitariis axillaribus, filiculis ovatis inflatis. *Goats-thorn with spear-shaped lobes, flowers proceeding singly from the sides of the branches, and oval, inflated, bladder pods*. Tragacantha humilis Balearica, foliis parvis vix incanis, flore albo. Salvador. *Low Goats-thorn of the Balearick Islands, having small leaves which are scarce hoary, and a white flower*.
3. TRAGACANTHA (*Argentea*) foliolis lanceolatis acuminatis tomentosis, floribus alaribus terminalibusque. *Goats-thorn with spear-shaped, acute-pointed, woolly leaves, and flowers growing on the sides and at the ends of the branches*. Tragacantha orientalis humillima argentea barbæ Jovis folio. Tourn. Cor. 29. *The lowest eastern Goats-thorn, with silvery leaves like those of Jupiter's Beard*.
4. TRAGACANTHA (*Glabra*) foliolis linearibus glabris, floribus congestis axillaribus. *Goats-thorn with very narrow smooth leaves, and flowers growing in clusters on the sides of the branches*. Tragacantha foliis minimis viridibus. Boerh. Ind. alt. 2. p. 53. *Goats-thorn with the least very green leaves*.

The first sort grows naturally on the sea-shore about Marseilles, and in Italy; this hath a thick, short, ligneous stalk, which branches out greatly on every side. The young branches are woolly; they are closely garnished with winged leaves, whose foot-stalks end in acute thorns. The lobes are small, oval, obtuse, and of a silvery colour. The flowers are large, white,

and shaped like a butterfly; they are produced in clusters at the end of the branches; these appear in June and July, and are succeeded by short pods having two longitudinal cells, containing two or three kidney-shaped seeds, which seldom ripen in England. The second sort grows naturally in the islands of Majorca and Minorca; this hath a thick woody stalk which rises about two feet high, sending out many ligneous branches, which are closely garnished with spear-shaped small leaves; they are hoary, and are ranged by pairs along a very strong foot-stalk, ending with a sharp point. The flowers are produced singly from the sides of the branches, they are large and white; these are succeeded by oval bladder pods, containing four kidney-shaped seeds; it flowers in July, but the seeds do not ripen in England.

The third sort grows naturally in the islands of the Archipelago; this has a very low shrubby stalk, which divides into many downy branches, which are garnished with winged leaves, composed of nine or ten pair of spear-shaped woolly lobes, which end in acute points; these are extended to the end of the foot-stalk, so there is not any part of it bare at the end, as in the other species. The flowers are produced from the side and at the top of the branches; they are white, and shaped like those of the other species, but smaller; they appear at the same time as the former sorts, but are not succeeded by pods in England.

The fourth sort grows naturally in Spain; this is a very low plant; the stalks are pretty thick and woody, but seldom rise to more than five or six inches high, dividing into several branches, which are closely garnished with small winged leaves, composed of several pair of small linear lobes which are smooth, and of a bright green colour. The foot-stalks of these end in very sharp thorns, which stand out beyond the lobes; the flowers grow in clusters from the side of the stalks; they are smaller than those of the other species, and are of a dirty white colour; these appear in July, but are not succeeded by seeds in England.

These sorts may be propagated by seeds, which must be procured from the countries where the plants grow naturally; these should be sown on a bed of fresh earth in April, and when the plants come up, they should be carefully kept clean from weeds, which, if permitted to grow amongst the plants, would soon overbear and destroy them while they are young. If the season should prove dry, it will be of great service to water the plants now and then, and when they are large enough to transplant, they should be carefully taken up, and some of them planted in small pots filled with fresh earth, placing them in the shade until they have taken root; after which time they may be removed into an open situation, where they may remain till the latter end of October, when they should be placed under a common frame, where they may be sheltered from severe frost, but may have free air in mild weather, when the glasses should not be put over them.

The remainder of the plants may be planted on a warm dry border, where they must be shaded until they take root; and if the season should continue dry, they must be refreshed with water, otherwise they will be in danger; because, when they are so young, their roots will not have established themselves in the ground sufficiently to nourish them in great droughts.

Those plants which were planted in pots, may be preserved for a year or two under frames in winter, until they have obtained strength, when they may be shaken out of the pots, and planted in a lean dry soil and a warm situation, where they will endure the cold of our ordinary winters very well; but as they are sometimes destroyed by hard winters, it will be proper to keep a plant of each kind in pots, which may be sheltered in winter to preserve the species.

These plants may be propagated by slips, for as they rarely produce seeds in this country, the latter method is generally used here. The best time for this work is in April, just as the plants begin to shoot, at which time the tender branches of the plants should be slip-

ped off, and their lower parts divested of the decayed leaves; then they should be planted on a very moderate hot-bed, which should be covered with mats, to screen them from the great heat of the sun by day, and the cold by night. These cuttings should be frequently, but gently watered, until they have taken root, after which they may be exposed to the open air, observing always to keep them clear from weeds, and in very dry weather they must be refreshed with water.

On this bed they may remain until the following spring, where, if the winter should be very severe, they may be covered with mats as before, and in April they may be transplanted out, either into pots filled with sandy light earth, or into warm borders, where, if the soil be dry, gravelly, and poor, they will endure the severest cold of our climate: but if they are planted in a very rich soil, they often decay in winter. From one species of this genus, Monsieur Tournefort says, the gum adragant, or dragon, is produced in Crete, of which he gives the following relation in his voyage to the Levant: "We had the satisfaction of fully observing the gum adragant on Mount Ida. I cannot understand how Bellonius comes to assert so positively, that there is no such thing in Candia; sure he had not read the first chapter of the ninth book of Theophrastus's History of Plants! The little bald hillocks about the sheepfold produce much of the Tragacantha, and that too a very good sort. Bellonius and Prosper Alpinus were doubtless acquainted with it, though it is hardly possible, from their descriptions, to distinguish it from the other kinds they make mention of. This shrub spontaneously yields the gum adragant towards the end of June, and in the following months, at which time, the nutritious juice of this plant, thickened by the heat, bursts open most of the vessels wherein it is contained. It is not only gathered in the heart of the trunk and branches, but also in the interspaces of the fibres, which are spread in the figure of a circle like rays of the sun. This juice is coagulated into small threads, which, passing through the bark, issue out by little and little, according as they are protruded by the fresh supplies of juice arising from the roots. This substance, being exposed to the air, grows hard, and is formed either in lumps, or slender pieces, curled and winding in the nature of worms, more or less long, according as matter offers. It seems as if the contraction of the fibres of this plant contributes to the expressing of the gum. These delicate fibres, as fine as Flax, being uncovered, and trodden by the feet of the shepherds and horses, are by the heat shrivelled up, and facilitate the emanation of the extravasated juices."

This gum should be light, and of a transparent white colour; it should have no taste or smell, and in small pieces of a different figure, and free from all kinds of dirt or filth. When this is dissolved in water, it is used to give a body to several medicines; it is also much used by the painters.

But notwithstanding what Tournefort has said concerning the gum adragant being produced from one particular species, many authors are of opinion, that it is taken from several other species, but particularly that of Marseilles, from whence that gum is often brought into England.

At present these plants are rarely preserved, excepting by some persons who are curious in botany; yet in large gardens many of them deserve a place, where, if they are planted on hillocks, or the slopes of dry banks, they will have a very good effect, especially those which retain their leaves through the year.

T R A G I A. Plum. Gen. Nov. 14. tab. 12. Lin. Gen. Plant. 930.

The CHARACTERS are,

It hath male and female flowers on the same plant. The empalement of the male flowers is cut into three oval acute-pointed segments which spread open; it has no petals, but there are three stamina in each, the length of the empalement,

ment, terminated by roundish summits; the empalement of the female flowers are permanent; they are cut into five oval concave segments. The flowers have no petals or stamina, but a roundish germen, having three furrows, supporting an erect style, crowned by a trifid spreading stigma. The germen afterward turns to roundish three-lobed capsules having three cells, each containing one globular seed. This genus of plants is ranged in the third section of Linnæus's twenty-first class, which includes those plants which have male and female flowers on the same plant, and the male flowers have three stamina.

The SPECIES are,

1. TRAGIA (*Volubilis*) foliis cordato-oblongis, caule volubili. Lin. Sp. Plant. 980. *Tragia with oblong heart-shaped leaves, and a twining stalk.* *Tragia scandens*, longo betonicæ folio. Plum. Gen. Nov. 14. *Climbing Tragia with a long Betony leaf.*
2. TRAGIA (*Involucrum*) fæmineis pentaphyllis pinnatifidis. Lin. Sp. Plant. 980. *Tragia with five-leaved involucri to the female flowers, which are wing-pointed.* *Ricinocarpos Zeylanica hirsuta*, foliis lanceolatis ferratis. Burm. Zeyl. 202. *Hairy Ricinocarpos of Ceylon, with spear-shaped sawed leaves.*

The title of this genus was applied to it by Father Plumier, who constituted the genus to the honour of Hieronymus Bock, an ancient botanist, who was commonly called *Tragus*.

The first sort grows plentifully in the savannahs in Jamaica, and the other warm parts of America, where it twines round whatever plants or trees it grows near, and rises seven or eight feet high, having tough woody stems. The leaves are oblong, and heart-shaped; they are an inch and a half long, and three quarters of an inch broad toward their base, ending in acute points, and are deeply sawed on their edges, standing alternately upon pretty long foot-stalks. The male flowers come out from the wings of the stalk, in long bunches of about two inches in length; the female flowers are produced on separate foot-stalks, arising from the same point as the male; these are succeeded by roundish capsules with three cells, each inclosing one roundish seed. The whole plant is covered with burning spines like those of the Nettle, which renders it very unpleasant to handle.

The second sort grows naturally in India; this rises with an erect ligneous stalk about three feet high, which rarely sends out any side branches; it is garnished with oblong spear-shaped leaves, which run out in very long acute points, and are sharply sawed on their edges; these are ranged alternately on the stalk, and are closely covered with yellowish stinging hairs. The flowers are produced in small clusters from the wings of the stalk, standing several together upon the same foot-stalk; the upper are all male, and the under female, and the latter are succeeded by roundish capsules with three cells, each inclosing one seed.

As these are plants of no great beauty, they are seldom preserved in this country, except in some botanic gardens for the sake of variety; they are propagated by seeds, which must be sown on a hot-bed early in the spring, and must afterward be transplanted into pots, and plunged into a hot-bed of tanners bark, and treated in the same manner as other tender plants which require to be kept in the bark-stove.

TRAGOPOGON. Tourn. Inst. R. H. 477. tab. 270. Lin. Gen. Plant. 810. [*Τραγοπώλον*, of *τράγος*, a goat, and *πώλον*, a beard, because the pappous seed, while it is included in the calyx, resembles a goat's beard.] *Goats-beard*; in French, *Barbe de Bouc*.

The CHARACTERS are,

The common empalement of the flower is single, and composed of eight acute-pointed leaves, which are alternately large, and joined at their base. The flower is composed of many hermaphrodite florets, which are uniform; they are of one petal, stretched out like a tongue, indented at their points in five parts, and lie over each other like the scales of fish; these have five short hair-like stamina terminated by cylindrical summits, and an oblong germen situated under the floret, supporting a slender style the length of the stamina, crowned by two revolving stigmas. The empale-

ment of the flower afterward swells to a belly, inclosing many oblong, angular, rough seeds, slender at both ends, crowned by a feathery down.

This genus of plants is ranged in the first section of Linnæus's nineteenth class, which contains those plants whose flowers are composed of only hermaphrodite florets, and their summits are connected with the style.

The SPECIES are,

1. TRAGOPOGON (*Pratense*) calycibus corollæ radium æquantibus, foliis integris strictis. Lin. Sp. Plant. 789. *Goats-beard with an empalement equal to the rays of the flower, and entire closed leaves.* *Tragopogon pratense luteum majus*. C. B. P. 274. *Greater yellow Meadow Goats-beard.*
2. TRAGOPOGON (*Minus*) calycibus corollæ radiis longioribus, foliis linearibus strictis. *Goats-beard with the empalement longer than the rays of the flower, and linear closed leaves.* *Tragopogon pratense luteum minus*. Hort. R. Blæf. *Smaller yellow Meadow Goats-beard.*
3. TRAGOPOGON (*Porrifolium*) calycibus corollæ radiis sesqui longioribus, foliis integris strictis, pedunculis supernè incrassatis. Hort. Upsal. 243. *Goats-beard with the empalement longer than the rays of the flower, entire closed leaves, and the foot-stalk thicker at the upper part.* *Tragopogon purpureo-cæruleum porri folio*, quod artificii vulgò. C. B. P. 274. *Goats-beard of a purple blue colour, and a Leek leaf, commonly called Salsafy.*
4. TRAGOPOGON (*Picroides*) calycibus corollâ brevioribus aculeatis, foliis pinnato-hastatis. Hort. Cliff. 382. *Goats-beard with prickly empalements which are shorter than the petals, and arrow wing-pointed leaves.* *Sonchus asper, laciniatus Creticus*. C. B. P. 124. *Rough Sow-thistle of Crete with jagged leaves.*
5. TRAGOPOGON (*Dalechampii*) calycibus monophyllis corollâ brevioribus inermibus, foliis runcinatis. Hort. Upsal. 224. *Goats-beard with an empalement of one leaf, shorter than the petals of the flower, and plain shaped leaves.* *Hieracium magnum Dalechampii*. Hist. 569. *Greatest Hawkweed of Dalechamp.*

The first sort grows naturally in the meadows of Austria and Germany; this is very different from the sorts which grow naturally in England, for I have sown the seeds of both sorts several years in the same bed of earth, and have always found the plants have retained their difference. The lower leaves are three quarters of an inch broad at their base, where they embrace the stalk; they are more than a foot long, and are closed together, ending in acute points. The stalk rises near three feet high, which is garnished at each joint with one leaf of the same shape with those below, but are smaller; it is terminated by one large yellow flower composed of hermaphrodite florets, which lie over each other like the scales of fish; these are included in one common simple empalement, which is equal in length to the rays of the flower. Each floret is succeeded by an oblong seed which is larger at the base than at the point, where it is crowned with a large feathery down. The seeds of the border or ray are crooked and rough, but those of the disk are straight and smooth. It flowers in June, and the seeds ripen about a month after.

The second sort grows naturally in moist pastures in many parts of England; it is by the common people titled *Sleep-at-noon*, or *Go-to-bed-at-noon*, because the flowers are generally closed up before that time every day. The lower leaves of this sort are almost as long as those of the first sort, but are not more than a third part so broad; they are of a deep green colour, and end in acute points. The stalks rise about a foot high, and sustain one yellow flower at the top, not more than half so large as those of the first; the empalement of these flowers are longer than the rays; the seeds of this are much smaller. It flowers about the same time with the former.

When this sort is shot up in stalk four inches high, the common people gather it out of the fields, and boil it in the same way as *Asparagus*, and some give it the preference.

The third sort is cultivated in gardens by the title of *Salsafy*. The roots of this are dressed in different ways,

and served up to the table; and of late years there are some persons who cultivate it for the stalks, which are cut in the spring when they are four or five inches high, which are dressed like Asparagus, in the like manner as the second sort. The stalks of this are much longer and are tenderer than the other, so are better for this purpose than those of the second sort; the leaves of this are broad; the flowers are large and blue; the foot-stalk immediately under the flower is much thicker than below, and the empalement is longer than the rays of the flower.

The fourth sort grows naturally in Crete, and also in Italy; this is an annual plant very like the Sow-thistle in stalk and leaf, but the empalement of the flower is prickly. It is seldom admitted into gardens, because the seeds are wafted by the winds to a great distance, and thereby fill the garden with weeds.

The fifth sort grows naturally about Montpellier; this hath many large, plain, shaped leaves at the root, which are six or seven inches long, and two broad, indented on their sides; the foot-stalks of the flower arise immediately from the root, and are a foot in length, supporting one large sulphur-coloured flower, composed of many florets, included in an empalement of one leaf, which is shorter than the corolla; the florets are succeeded by oblong seeds, crowned by a feathery down.

These plants are propagated from seeds, which should be sown in April upon an open spot of ground, in rows about nine or ten inches distance, and when the plants are come up, they should be hoed out, leaving them about six inches asunder in the rows. The weeds should also be carefully hoed down as they are produced, otherwise they will soon overbear the plants and spoil them. This is all the culture required, and if the soil be light and not too dry, the plants will have large roots before winter, at which time the Salsify, whose roots are eaten at that season, will be fit for use, and may be taken up any time after their leaves begin to decay; but, when they begin to shoot again, they will be sticky and not fit for use; but many persons cultivate this sort for the shoots, as was before mentioned.

The common yellow sort, whose shoots are sold in the market, will be fit for use in April or May, according to the forwardness of the season. The best time to cut them is, when their stems are about four inches long, for if they stand too long, they are never so tender as those which are cut while young.

Some people, in cultivating these plants, sow their seeds in beds pretty close, and when they come up, they transplant them out in rows at the before mentioned distance; but, as they form a tap-root, which abounds with a milky juice, when the extreme part of their roots are broken by transplanting, they seldom thrive well afterward; therefore, it is by far the better way to make shallow drills in the ground, and scatter the seeds therein, as before directed, whereby the rows will be at a due distance; and there will be nothing more to do than to hoe out the plants when they are too thick in the rows, which will be much less trouble than the other method of transplanting, and the plants will be much larger and fairer.

TRAGOSELINUM. See PIMPINELLA.

TRANSPLANTING OF TREES. See PLANTING.

TRANSPORTATION OF PLANTS: In sending plants from one country to another, great regard should be had to the proper season for doing it; for example, if a parcel of plants are to be sent from a hot country to a cold one, they should be sent in the spring of the year, that, as they come toward the colder countries in the warmest season, so if they have suffered a little in their passage, there will be time to recover them before winter; whereas those which arrive in autumn, are often lost in winter, because they have not time to recover and get root before the cold comes on.

On the contrary, those plants which are sent from a

cold country to a hot one, should always be sent in the beginning of winter, that the cold may prevent their shooting during the passage, and that they may arrive time enough to be rooted before the great heats come on, otherwise they will soon perish.

The best way to pack up plants for a voyage (if they are such as will not bear to be kept out of the ground) is to have some strong boxes with handles to them, for the more easily removing them in bad weather; these should have holes bored in their bottoms to let out the moisture, otherwise it will rot the roots of the plants. Over each of these holes should be laid a flat tile, or oyster-shell, to prevent the earth from stopping them; then they should be filled up with earth, into which the plants should be set as close as possible, in order to save room, which is absolutely necessary, otherwise they will be very troublesome in the ship; and as the only thing intended is to preserve them alive, and not to make any progress while on their passage, a small box will contain many plants, if rightly planted. The plants should also be placed in the box a fortnight or three weeks before they are put on board the ship, that the earth may be a little settled about their roots; and during the time they are on board, they should remain, if possible, on the deck, that they may have air; but in bad weather they should be covered with a tarpaulin to guard them against the salt water and spray of the sea, which will destroy them, if it comes at them in any quantity.

The water these plants should have, while on board, must be proportioned to the climate whence they come, and to which they are going. If they come from a hot country to a cold one, then they should have very little moisture after they have passed the heats; but, if they are carried from a cold country to a hot one, they must have a great share of moisture when they come into a warmer climate, and should be shaded in the day from the violent heat of the sun, to which if they are too much exposed, will dry them up and destroy them. If the plants to be sent from one country to another, are such as will live out of the ground a considerable time, as all those which are full of juice will do; as the Sedums, Ficoides, Euphorbiums, Cereuses, &c. then they require no other care but to pack them up in a close box, wrapping them up well with dry Moss, observing to place them so closely that they may not be tumbled about, which will bruise them, and that those plants which have spines may not wound any of the others. The box also should be placed where they may receive no moisture, and where rats cannot come to them, otherwise they are in danger of being eaten by those vermin; if these plants are packed too close, they are apt to ferment, and thereby either rot, or at least grow sickly; to prevent which, they should have a good quantity of dry hay or straw laid between them, and several small holes should be made in the boxes, to let out the noxious air.

If these plants are thus carefully packed up, they will grow though they should be two, three, or four months on their passage; and will be less liable to suffer than if planted in earth, because the sailors generally kill these plants by over watering them.

There are also several sorts of trees, which may be packed up in chests with Moss about them, which will bear to be kept out of the ground two or three months, provided it be at a season when they do not grow; as may be seen by the Orange-trees, Jasmynes, Capers, Olive, and Pomegranate-trees, which are annually brought from Italy; and if skilfully managed, very few of them miscarry, notwithstanding they are many times kept three or four months out of the ground.

In sending seeds from one country to another, the great care to be taken is, to secure them from vermin, and preserve them dry, otherwise they mould and decay. The method Mr. Catesby always observed was, to put up his seeds dry into papers, and then put them into a dry Gourd-shell, and seal them up; in which

which way he sent several large parcels of seeds from Carolina to England, which never miscarried. There are some persons who have directed to put them into glasses, and to seal them closely down, to keep out the external air; but from several experiments of this kind which I have made, I find seeds thus closely put up will not grow, if they remain stopped up any considerable time, all seeds requiring some share of air to preserve their vegetating quality; so that where a person has no other conveniency, they may be put up in a bag, and hung up in a dry part of the ship, or put into a trunk, where they may be safe from vermin, in which places they will keep very well.

N. B. It is the safest way to bring all sorts of seeds in their pods or husks in which they grew, provided they are put up dry; because their own covering will afford them some nourishment, if the seeds are not separated from the placenta.

TRIANTHEMA A. Lin. Gen. Plant. 537. *Portulacastrum*. Jussæi 1.

The CHARACTERS are,

It hath an empalement composed of two small awl-shaped leaves; the flower has five oval petals which spread open, and commonly five stamina which are shorter than the corolla, terminated by oval twin summits, and a cylindrical germen whose upper part is truncated, having two horns, supporting a slender stinging style, with a fissure which runs through the twin summits, crowned by a single stigma. The empalement afterward becomes a two-cornered cylindrical capsule with one cell, inclosing eight or ten seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. **TRIANTHEMA** (*Procumbens*) foliis obovatis petiolatis, floribus sessilibus caulibus procumbentibus. Aët. Phil. 1763. *Trianthema with procumbent stalks, almost oval leaves on foot-stalks, and flowers sitting close to the stalks. Portulaca Curassavica procumbens, capparidis folio, flore muscoso, capsula bifurca. Par. Bat. 213. Purslain from Curassao, with trailing stalks, a Caper leaf, and a two-horned capsule.*
2. **TRIANTHEMA** (*Diffusa*) foliis ovatis petiolatis, floribus confertis axillaribus sessilibus, caule diffuso. Aët. Phil. 1763. *Trianthema with diffused stalks, oval leaves, and the flowers in clusters sitting close at the wings of the stalks.*

The first sort grows naturally in most of the islands in the West-Indies, where it is often a troublesome weed; this sends out many trailing branches which lie flat on the ground, spreading two feet or more each way; these have much the appearance of Purslain, and have fleshy succulent leaves almost oval: the flowers come out from the joints of the stalks; they are somewhat of a purple colour, not much unlike those of Purslain, and are succeeded by capsules having two horns, with one cell inclosing eight or ten seeds.

The second sort grows in the East-Indies: this rises with succulent diffused stalks near two feet high, garnished with oval leaves less succulent than those of the first. The flowers are white, and are produced in clusters sitting close to the stalks, and are succeeded by capsules containing several seeds.

These plants are both annual in this country, and are seldom preserved except in botanic gardens for variety. Whoever has a mind to cultivate them, must sow their seeds on a good hot-bed in the spring, and when the plants are fit to remove, they should be planted on another hot-bed to bring them forward, otherwise they will not ripen their seeds. In June they may be transplanted into a warm border, where they will grow until the frost in autumn kills them.

TRIBULUS. Tourn. Inst. R. H. 265. tab. 141. Lin. Gen. Plant. 476. *Caltrops*.

The CHARACTERS are,

The empalement of the flower is cut into five acute parts, which are a little shorter than the petals; there are five oblong blunt petals to the flower which spread open, and

ten small awl-shaped stamina terminated by single summits, and an oblong germen the length of the stamina, having no style, but crowned by a beaded stigma. The germen afterward turns to a roundish prickly fruit, divided into five capsules, armed with three or four thorns, angular on one side, joining together. The cells are transverse, and contain two or three Pear-shaped seeds.

This genus of plants is ranged in the first section of Linnæus's tenth class, which includes those plants which have ten stamina and one style.

The SPECIES are,

1. **TRIBULUS** (*Terrestris*) foliolis sexjugatis subæqualibus, seminibus quadricornibus. Hort. Cliff. 160. *Caltrops with six pair of lobes to each leaf, which are almost equal, and four horns to each seed. Tribulus terrestris, folio ciceris, fructu aculeato. C.B.P. 250. Land Caltrops with a Chick leaf, and a prickly fruit.*
2. **TRIBULUS** (*Maximus*) foliolis quadrijugis exterioribus majoribus. Lin. Sp. Plant. 386. *Caltrops with four pair of lobes to each leaf, of which the outer are the largest. Tribulus terrestris major, flore maximo odorato. Sloan. Cat. Jam. 93. Greater Caltrops with the largest sweet flower.*
3. **TRIBULUS** (*Cistoides*) foliolis octojugatis subæqualibus. Lin. Sp. Plant. 387. *Caltrops with eight pair of lobes to each leaf, which are almost equal. Tribulus terrestris major Curassavicus. Par. Bat. 236. Greater Land Caltrops of Curassao.*

The first sort is a very common weed in the south of France, in Spain, and Italy, where it grows among Corn, and on most of the arable land, and is very troublesome to the feet of cattle; for the fruit being armed with strong prickles, run into the feet of the cattle which walk over the land. This is certainly the plant which is mentioned in Virgil's Georgicks, under the title of Tribulus, though most of his commentators have applied it to other plants.

It is called in English Caltrops, from the form of the fruit, which resembles those instruments of war that were cast in the enemies way to annoy their horses.

This hath a slender fibrous root, from which spring out four or five slender stalks which spread flat on the ground; they are hairy, and extend two feet and a half in length; these are garnished at each joint with winged leaves, composed of six pair of narrow hairy lobes, almost of equal size; those on the lower part of the stalk stand alternately, but toward the top they are placed opposite. The flowers come out from the wings of the stalk, standing upon short foot-stalks; they are composed of five broad, obtuse, yellow petals, which spread open. In the center is situated an oblong germen, crowned by a headed stigma, attended by ten short stamina, terminated by single summits. The flowers appear in June and July, which are succeeded by roundish, five-cornered, prickly fruit, which, when ripe, divides into five parts, each having a transverse cell containing one or two seeds, which ripen in August and September.

This plant is preserved in several curious gardens in England, for the sake of variety. It is propagated by seeds, which should be sown in autumn, for those which are kept out of the ground till spring, commonly remain in the ground a whole year before the plants come up. These seeds should be sown on an open bed of fresh light earth, where they are designed to remain; for, as it is an annual plant, it doth not bear transplanting very well, unless it be done when the plants are very young. In the spring, when the plants come up, they should be carefully cleared from weeds, and where they come up too close, some of the plants should be pulled out to give room for the remaining plants to grow; after this they will require no other culture but to keep them clear from weeds. In June they will begin to flower, and their seeds will ripen in August and September, which, if permitted to scatter, the plants will come up the following spring, and maintain their place, if they are not overborne with weeds.

T R I

The second fort grows naturally in Jamaica, and some of the other islands in the West-Indies; this is an annual plant, with pretty thick, compressed, channelled stalks which trail upon the ground, and are near two feet long, garnished with winged leaves placed by pairs opposite; these are sometimes composed of three, but most commonly of four pair of lobes, the outer being the largest; they are smooth, and sit close to the foot-stalk. The flowers come out from the wings of the stalk; they are composed of five large yellow petals which spread open, and have an agreeable odour; these are succeeded by roundish prickly fruit ending in a long point, but seldom ripen in England.

The third fort grows naturally in the West-Indies; it was found by the late Dr. Houstoun at the Havannah; this has a ligneous root, from which spring out many stalks which are hairy, jointed, and trail upon the ground; these are garnished at each joint by winged leaves, which differ greatly in size, one of the leaves at each joint being composed of eight pair of oblong lobes which are nearly equal, and opposite to this comes out a small leaf composed of but four pair of lobes. The large leaves stand alternately upon the stalks, and the small ones on the opposite side; the stalks are near two feet long, and at the wings of the stalks come out the foot-stalks of the flowers, which are hairy, and near two inches long, each sustaining one pale yellow flower, composed of five large petals, which have narrow tails, but are very broad and rounded at their points. The flowers are succeeded by roundish fruit armed with very acute spines, but these rarely ripen in England.

The two last forts being natives of hot countries, are very tender, so must be sown on a hot-bed early in the spring; and when the plants are come up, they must be each transplanted into a separate pot filled with rich light earth, and then plunged into a hot-bed of tanners bark, where they must be treated in the same manner as other tender exotic plants, being careful to bring them forward as early as possible in the summer, otherwise they will not perfect their seeds in this country.

The third fort will live through the winter, if it is plunged in the bark-stove, and treated in the same way as other tender plants, and the following summer they will flower earlier, so there will be more time for the seeds to ripen.

TRICOMANES, Maiden-hair.

There are three or four varieties of this plant, which grow naturally in Europe, but in America there is a great number of species, which are remarkably different from each other, as also from the European kinds.

These being of the tribe of Ferns or capillary plants, are seldom preserved in gardens. Their roots should be planted in moist shady places, especially the European forts, which commonly grow from between the joints of old walls, and in other very moist shady situations; but those forts which are brought from hot countries, must be planted in pots filled with rubbish, and strong earth mixed, and in winter they must be screened from hard frosts, to which, if they are exposed, it will destroy them.

The common fort in England is generally sold in the markets for the true Maiden-hair, which is a very different plant, and not to be found in England, it being a native of the south of France, and other warm countries, so is rarely brought to England.

TRICHOSANTHES. Lin. Gen. Plant. 966. Anguina. Michel. 9.

The CHARACTERS are,

It has male and female flowers at separate distances on the same plant. The male flowers have a long smooth empalement of one leaf, cut into five small segments at the top, which are reflexed; the petal is plain, spreading, and cut into five parts, ending in long branching hairs; they have three short stamina arising from the point of the empalement, terminated by cylindrical erect summits joined in a body, and three small styles fastened to the empalement.

T R I

The female flowers sit upon the germen, and have empalements and petals like the male flowers, but have no stamina; they have a long slender germen situated under the flower, supporting a style the length of the empalement, crowned by three oblong stigmas. The germen afterward turns to a succulent fruit having three cells, inclosing many compressed seeds.

This genus of plants is ranged in the tenth section of Linnæus's twenty-first class, which includes the plants whose flowers have male and female florets on the same plant, and the summits are connected together.

We have but one SPECIES of this genus in the English gardens, viz.

TRICOSANTHES (*Anguina*) pomis teretibus oblongis incurvis. Hort. Cliff. 450. *Tricosanthes with a taper, oblong, incurved fruit.* Anguina Sinensis, flore albo elegantissimo, fructu oblongo intorto. Michel. Gen. 12. tab. 9. *China Serpent Cucumber with a most elegant white flower, and an oblong intorted fruit.*

This plant grows naturally in China, it is an annual, and of the Cucumber tribe. The stalks run to a great length, and if they are not supported, trail upon the ground, in the same manner as Cucumbers and Melons. The leaves are angular and rough; the flowers come out from the side of the stalks; they are white, and cut into many small filaments or threads. The fruit is taper, near a foot long, incurved, and divided into three cells, which include many compressed seeds like those of Cucumber.

It is propagated by seeds, which must be sown on a hot-bed early in the spring, and afterwards treated in the same way as Cucumbers and Melons, keeping them covered with glasses, otherwise they will not ripen their fruit here.

TRICHOSTEMA. Gron. Flor. Virg. 64. Lin. Gen. Plant. 652.

The CHARACTERS are,

It has a lipped empalement to the flower of one leaf; the upper lip is twice as large as the under, and is cut into three equal acute segments, the under lip into two. The flower is of the lip kind, it has a very short tube; the upper lip is compressed and hooked, and the under lip is cut into three segments, the middle one being the least; it has four hair-like stamina which are long and incurved, two of them being a little shorter than the other, terminated by single summits, and a four-pointed germen supporting a long slender style, crowned by a bifid stigma. The germen afterward turn to four roundish seeds, inclosed in the swollen empalement of the flower.

This genus of plants is ranged in the first section of Linnæus's fourteenth class, which includes those plants whose flowers have two longer and two shorter stamina, and the seeds are naked in the flower-cup.

The SPECIES are,

1. TRICHOSTEMA (*Dichotomum*) staminibus longissimis exsertis. Lin. Sp. Plant. 598. *Trichostema with the longest stretched out stamina.* Cassida Mariana, majorana folio. Pet. Suc. 243. *Maryland Scull Cap with a Marjoram leaf.*
2. TRICHOSTEMA (*Brachiatum*) staminibus brevibus inclusis. Lin. Sp. Plant. 598. *Trichostema with shorter stamina included in the petal.* Teucrium Virginianum origani folio. Hort. Elth. 380. *Virginia Germander with a wild Marjoram leaf.*

The first fort grows naturally in many parts of North America; it is an annual plant, which rises about six or eight inches high, dividing into small branches, which are garnished with small roundish leaves, not unlike those of Sweet Marjoram; these are placed opposite, and are covered with fine, small, downy hairs. The flowers are produced at the wings of the branches; they are small, and of a purple colour, gaping with two lips; the upper lip is arched, and is much larger than the lower; it is cut into three acute points; the lower lip is small, and cut into two points. These appear late in August, so that unless the season proves warm, the seeds will not ripen in England.

T R I

The second sort grows naturally in Virginia; this hath an herbaceous branching stalk, which rises from nine inches to a foot high; it has four angles, and the leaves stand by pairs on the branches; they are shaped like those of the wild Marjoram, and are a little hairy, sitting close to the branches. The flowers are produced at the top of the branches; they are small, and of a purple colour. The four stamina stand within the tube of the flower; these flowers do not appear till the end of summer, so the seeds seldom ripen here.

They are propagated by seeds, which should be sown in pots filled with light earth in autumn; and in winter the pots should be placed under a frame to shelter them from severe frost, but should be exposed to the open air at all times when the weather is mild. In the spring the plants will appear, and when they are fit to remove, they should be planted on a bed of light earth, shading them from the sun till they have taken fresh root, then they will require no other culture but to keep them clean from weeds.

TRIDAX. Lin. Gen. Plant. 872. After. Houft. MSS. American Starwort.

The CHARACTERS are,

The flower has a common cylindrical imbricated empalement. The scales are acute-pointed, and erect. The flowers are composed of hermaphrodite florets in the disk, and the rays are of female half florets. The hermaphrodite florets are funnel-shaped, of one petal, and cut at the brim into five points; these have five short hair-like stamina, terminated by cylindrical summits joined together, and an oblong crowned germen supporting a bristly style, crowned by an obtuse stigma. The germen afterward becomes an oblong single seed, crowned with a simple down. The female half florets are plain, of one petal, and cut into three segments at the top; these have an oval germen like the hermaphrodite florets, but no stamina, and are succeeded by single seeds of the same shape.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which contains the plants whose flowers are composed of hermaphrodite and female florets, which are both fruitful.

We know but one SPECIES of this genus, viz.

TRIDAX (*Procumbens*.) Hort. Cliff. 418. After procumbens, flore ochroleuco, foliis laciniatis & hirsutis. Houft. MSS. *Trailing Starwort with a whitish copper-coloured flower, and hairy jagged leaves.*

This plant was discovered by the late Dr. Houstoun, growing naturally by the road side leading to old La Vera Cruz, in America. The stalks of this trail upon the ground and emit roots at their joints, whereby it spreads and propagates; they are herbaceous and hairy, and garnished with rough hairy leaves placed by pairs, about an inch and a half long, and three quarters of an inch broad, ending in acute points, and are acutely jagged on their edges. The flowers are produced upon long naked foot-stalks, which terminate their branches. They have one common empalement composed of oval scales, ending in acute points, which lie over each other like the scales of fish; within which are ranged many female half florets, which compose the border or rays, and a good number of hermaphrodite florets which form the disk or middle; these are of a pale copper colour, inclining to white, and are each succeeded by a single oblong seed crowned with down.

This plant is propagated by seeds, which should be sown in pots and plunged into a hot-bed, and when the plants come up and are fit to remove, they should be each planted in a small pot filled with light earth, and plunged into a hot-bed of tanners bark, observing to shade them from the sun till they have taken new root; then they must afterward be treated in the same way as other tender plants from the West-Indies, placing them in the bark-stove in autumn, where they should constantly remain.

It may also be propagated by its trailing stalks, which frequently put out roots at their joints; if these are cut off and planted, they will make new plants. This

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plant does not produce flowers in plenty here, and but rarely perfects its seeds in England.

TRIFOLIUM. Tourn. Inst. R. H. 404. tab. 228. Lin. Gen. Plant. 896. [of tres, three, and folium, Lat. a leaf.] Trefoil; in French, *Trefle*.

The CHARACTERS are,

The flower has a tubulous permanent empalement of one leaf. The flower is of the butterfly kind, and is frequently permanent, drying in the empalement. The standard is reflexed, the wings are shorter than the standard, and the keel is shorter than the wings; it has ten stamina, nine are joined, and one is separate, terminated by single summits, and an almost oval germen supporting an awl-shaped style, crowned by a single stigma. The germen afterward becomes a short pod with one valve, containing a few roundish seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which contains those plants whose flowers have ten stamina joined in two bodies; and to this genus he has added the Trifolium of Micheli, some of the species of Melilot of Tournefort, and the Lupinaster of Buxbaum.

There are great numbers of species of this genus, several of which grow naturally in England, and others in several parts of Europe; but as many of them are plants of small estimation, they are rarely cultivated either in the field or garden; therefore it would be swelling this work too much to enumerate them here, so I shall select only such of them as are cultivated either for use or beauty.

The SPECIES are,

1. TRIFOLIUM (*Pratense*) spicis subvillosis, cinctis stipulis oppositis membranaceis, corollis monopetalis. Lin. Sp. Plant. 1082. *Trefoil with hairy spikes, membranaceous stipule placed opposite, and flowers of one petal. Trifolium purpureum, majus, pratense simile. Raii Syn. 328. The Red or Dutch Clover.*
2. TRIFOLIUM (*Repens*) capitulis umbellaribus leguminibus tetraspermis, caule repente. Lin. Sp. Plant. 767. *Trefoil with umbellated heads, pods having four seeds, and a creeping stalk. Trifolium pratense album. C. B. P. 327. White Meadow Trefoil, Honeyfuckle Grass, or white Dutch Clover.*
3. TRIFOLIUM (*Agrarium*) spicis ovalibus imbricatis, vexillis deflexis persistentibus, calycibus nudis, caule erecto. Flor. Suec. 617. *Trefoil with oval imbricated spikes of flowers, having deflexed permanent standards, naked empalements, and an erect stalk. Trifolium pratense luteum, capitulo lupuli vel agrarium. C. B. P. Yellow Meadow Trefoil, or Hop Clover.*
4. TRIFOLIUM (*Filiforme*) spicis imbricatis, vexillis deflexis persistentibus, calycibus pedicellatis, caulibus procumbentibus. Lin. Sp. Plant. 773. *Trefoil with imbricated spikes of flowers, having deflexed permanent standards, empalements standing upon foot-stalks, and trailing stalks. Trifolium luteum, lupulinum, minimum. Hist. Ox. 2. 142. The least yellow Hop Trefoil, called None-such, or Black Seed.*
5. TRIFOLIUM (*Ochroleucrum*) spicis ovatis, calycibus foliatis, caule erecto villoso, foliolis lanceolatis. *Trefoil with oval spikes of flowers, having leafy empalements, an erect hairy stalk, and spear-shaped leaves. Trifolium pratense hirsutum majus, flore albo sulphurea, seu ochroleucrum. Raii Cat. Cant. Greater, hairy, Meadow Trefoil, with a whitish sulphur or copper-coloured flower, commonly called Trefoil.*
6. TRIFOLIUM (*Rubens*) spicis villosis longis corollis monopetalis, caule erecto, foliis ferrulatis. Hort. Cliff. 375. *Trefoil with oblong, blunt, hairy spikes of flowers, of one petal, erect stalks, and sawed leaves. Trifolium spica oblonga rubra. C. B. P. 328. Trefoil with an oblong red spike.*
7. TRIFOLIUM (*Squarrosum*) spicis subpilosis, calycum infimo dente longissimo reflexo, caule herbaceo. Lin. Sp. Plant. 1082. *Trefoil with hairy spikes of flowers, whose empalements have long reflexed indentures, and an herbaceous stalk. Trifolium Hispanicum angustifolium, spica dilute rubente. C. B. P. 328. Narrow-leaved Spanish Trefoil, with pale red flowers.*
8. TRIFOLIUM

8. *TRIFOLIUM (Angustifolium)* spicis villosis conico-oblongis, dentibus calycinis fetaceis, subæqualibus, foliolis linearibus. Hort. Cliff. 375. *Trefoil with oblong, conical, hairy spikes, having bristly indentures to the empalements which are almost equal, and linear lobes to the leaves.* *Trifolium montanum, angustissimum, spicatum.* C. B. P. 238. *Spiked Mountain Trefoil with the narrowest leaves.*
9. *TRIFOLIUM (Arvense)* spicis villosis ovalibus, dentatis calycinis fetaceis æqualibus. Hort. Cliff. 375. *Trefoil with oval hairy spikes, and bristly indentures to the empalements which are equal.* *Trifolium arvense humile spicatum sive lagopus.* C. B. P. 328. *Hare's-foot Trefoil.*
10. *TRIFOLIUM (Fragiferum)* capitulis subrotundis, calycibus inflatis bidentatis reflexis, caulibus repentibus. Hort. Cliff. 373. *Trefoil with roundish heads, reflexed bladder empalements with two teeth, and a creeping stalk.* *Trifolium fragiferum friscum.* C. B. P. 329. *Strawberry Trefoil.*
11. *TRIFOLIUM (M. Officinalis)* leguminibus racemosis nudis dispermis, caule erecto. Hort. Cliff. 376. *Trefoil with long naked bunches of pods containing two seeds, and an erect stalk.* *Melilotus officinarum Germanicæ.* C. B. P. 331. *Common Melilot.*
12. *TRIFOLIUM (M. Cærulea)* spicis oblongis, leguminibus seminudis mucronatis, caule erecto. Hort. Cliff. 375. *Trefoil with oblong spikes, half naked acute-pointed pods, and an upright stalk.* *Lotus hortensis odora.* C. B. P. 330. *Sweet Trefoil.*

The first sort, which is well known in England by the title of red Clover, needs no description; this has been frequently confounded with the red Meadow Trefoil by the botanists, who have supposed they were the same species; but I have often sown the seeds of both in the same bed, which have constantly produced the two species without varying. The stalks of the Meadow Trefoil are weak and hairy; the stipulæ, which embrace the foot-stalks of the leaves are narrow and very hairy; the heads of flowers are rounder and not so hairy as those of the Clover, whose stalks are strong, almost smooth, furrowed, and rise twice the height of the other; the heads of flowers are large, oval, and hairy; the petal of the flowers open much wider, and their tubes are shorter than those of the other; but the Clover has been so much cultivated in England for near a hundred years past, that the seeds have been scattered over most of the English pastures, so that there are few of them who have not Clover mixed with the other Grasses; and this has often deceived the botanists, who have supposed that the Meadow Trefoil has been improved to this by dressing of the land.

Since the red Clover has been cultivated in England, there has been great improvement made of the clay lands, which before produced little but Rye-grass, and other coarse bents; which, by being sown with red Clover, have produced more than six times the quantity of fodder they had formerly on the same land, whereby the farmers have been enabled to feed a much greater stock of cattle than they could before, which has enriched the ground, and prepared it for Corn; and where the land is kept in tillage, it is the usual method now among the farmers, to lay down their ground with Clover, after having had two crops of Corn, whereby there is a constant rotation of Wheat, Barley, Clover, or Turneps on the same land.

The Clover-seed is always sown with Barley in the spring, and when the Barley is taken off, the Clover spreads and covers the ground, and this remains two years, after which the land is ploughed again for Corn. The Clover is a biennial plant, whose roots decay after they have produced seeds; but by eating it down, or mowing it when it begins to flower, it causes the roots to send out new shoots, whereby some of the plants are continued longer than they would naturally remain. The common allowance of seed for an acre of ground is ten pounds. In the choice of the seeds, that which is of a bright yellow colour, inclining to brown should be preferred, and the pale-coloured thin feed should be rejected. The Clover-seed should be

sown after the Barley is harrowed in, otherwise it will be buried too deep; and after the seeds are sown, the ground should be rolled, which will press the seeds into the ground; but this should be done in dry weather, for moisture will often cause the seeds to burst, and when the ground is wet, the seeds will stick to the roll. This is the method which is generally practised by most people in the sowing of this seed with Corn, but it will be much better if sown alone; for the Corn prevents the growth of the plants until it is reaped and taken off the ground, so that one whole season is lost; and many times, if there be a great crop of Corn upon the ground, it spoils the Clover, so that it is hardly worth standing; whereas, when it is sown without any other seed, the plants will come up more equal, and come on much faster than that which was sown the spring before under Corn.

Therefore from many years trial I would advise the seeds to be sown in August, when there is a prospect of rain soon after; for as the ground is at that season warm, so the first shower of rain will bring up the plants, and these will have time enough to get strength before the winter: and if, some time in October, when the ground is dry, the Clover is well rolled, it will press the ground close to the roots, and cause the plants to send out more shoots; the same should be repeated in March, which will be found very serviceable to the Clover. The reason of my preferring this season for the sowing of the seeds rather than the spring is, because the ground is cold and wet in spring, and if much rain fall after the seeds are sown, they will rot in the ground; and many times when the seed is sown late in the spring, if the season should prove dry, the seeds will not grow, so that I have always found the other season has been the best.

About the latter end of May this Grass will be fit to cut, when there should be great care taken in making it; for it will require a great deal more labour and time to dry than common Grass, and will shrink into less compass; but if it be not too rank, it will make extraordinary rich food for cattle. The time for cutting it is, when it begins to flower; for if it stands much longer, the lower part of the stems and the under leaves will begin to dry, whereby it will make a less quantity of hay, and that not so well flavoured. Some people cut three crops in one year of this Grass, but the best way is to cut but one in the spring, and feed it the remaining part of the year, whereby the land will be enriched, and the plants will grow much stronger.

One acre of this plant will feed as many cattle as four or five acres of common Grass; but great care should be taken of the cattle when they are first put into it, lest it burst them: to prevent which, some turn them in for a few hours only at first, and so stint them as to quantity; and this by degrees, letting them at first be only one hour in the middle of the day, when there is no moisture upon the Grass, and so every day suffer them to remain a longer time, until they are fully seasoned to it; but great care should be had never to turn them into this food in wet weather; or if they have been for some time accustomed to this food, it will be proper to turn them out at night in wet weather, and let them have hay, which will prevent the ill consequences of this food; but there are some who give straw to their cattle while they are feeding upon this Grass, to prevent the ill effects of it; which must not be given them in the field, because they will not eat it where there is plenty of better food. There are others who sow Rye-grass amongst their Clover, which they let grow together, in order to prevent the ill consequences of the cattle feeding wholly on Clover; but this is not a commendable way, because the Rye-grass will greatly injure the Clover in its growth, and the seeds will scatter and fill the ground with bents.

Where the seeds are designed to be saved, the first crop in the spring should be permitted to stand until the seeds are ripe, which may be known by the stalks and heads changing to a brown colour; then it should be

be cut in a dry time, and when it is well dried, it may be housed until winter, if the seeds are not wanted before, when the seeds should be threshed out; but if the seeds are wanted for immediate sowing, it may be threshed out before it be housed or stacked; but then it must be well dried, otherwise the seeds will not quit their husks.

It has been a great complaint amongst the farmers, that they could not thresh out these seeds without great labour and difficulty; which I take to be chiefly owing to their cutting the spring crop when it begins to flower, and so leave the second crop for seed, which ripens so late in autumn, that there is not heat enough to dry the husks sufficiently, whereby they are tough, and the seeds rendered difficult to get out; which may be entirely remedied by leaving the first crop for seed, as hath been directed, and then the ground will be ready to plough, and prepare for Wheat the same year, which is another advantage.

When cattle are fed with this hay, the best way is to put it in racks, otherwise they will tread a great quantity of it down with their feet. This feed is much better for most other cattle than milch cows, so that these should rarely have any of it, lest it prove hurtful to them; though when it is dry, it is not near so injurious to any sort of cattle as when green.

The second sort grows naturally in most of the pastures in England, and is generally known among the country people by the title of white Honeyfuckle.

This is an abiding plant, whose branches trail upon the ground, and send out roots from every joint, so that it thickens and makes the closest sward of any of the sown Grasses; and it is the sweetest feed for all sorts of cattle yet known; therefore when land is designed to be laid down for pasture, with intent to continue so, there should always be a quantity of the seeds of this plant sown with the Grass seeds. The usual allowance of this feed is eight pounds to one acre of land, but this should never be sown with Corn; for if there is a crop of Corn, the Grass will be so weak under it, as to be scarce worth standing: but such is the covetousness of most farmers, that they will not be prevailed on to alter their old custom of laying down their grounds with a crop of Corn, though they lose twice the value of their Corn by the poorness of the Grass, which never will come to a good sward, and one whole season is also lost; for if this seed is sown in the spring without Corn, there will be a crop of hay to mow by the middle or latter end of July, and a much better after-feed for cattle the following autumn or winter, than the Grass which is sown with Corn will produce the second year. The seed of this sort may also be sown with Grass seeds in autumn, in the manner before directed for the common red Clover; and this autumnal sowing, if the seeds grow kindly, will afford a good early crop of hay the following spring; and if, after the hay is taken off the land, the ground is well rolled, it will cause the Clover to mat close upon the ground, and become a thick sward.

The seeds of this white Dutch Clover is annually imported from Flanders, by the way of Holland, from whence it received the name of Dutch Clover; not that it is more a native of that country than of this, for it is very common in moist pastures in every county in England, but the seeds were never collected for sowing here till of late years: nor are there many persons at present here who save this seed, although it may be done, if the same care as is practised for the red Clover, is taken with this sort; therefore it should be recommended to every farmer, who is desirous to improve his land, carefully to sow an acre or two of this white Clover by itself for seeds, which will save him the expence of buying the seeds, which are often sold at a great price, and there will be no want of sale for any quantity they may have to spare.

The farther account of this Grass, may be seen under the article PASTURE.

The third sort grows naturally among the Grass in most of the upland pastures in this country, but the seeds are frequently sold in the shops by the title of Hop

Clover, and are by many people mixed with the other sorts of Clover and Grass seeds, for laying down ground to pasture: this grows with upright branching stalks about a foot high, which are garnished with trifoliate leaves whose lobes are oblong and heart-shaped, but reversed at the narrow point, joining the foot-stalks. The flowers grow from the wings of the stalk upon long foot-stalks, and are collected into oval imbricated heads; they are yellow, and have naked empalements lying over each other like scales, somewhat like the flowers of Hops, from whence this plant had the title of Hop Clover. But there are two sorts of this which grow naturally in England. The other, which is the fourth sort, is a much smaller plant than this, and has trailing stalks. The heads of flowers are smaller, and the flowers are of a deeper yellow colour; these are not abiding plants, so are by no means proper to be sown where the ground is designed to continue in pasture; but in such places where one or two crops only are taken, and the land is ploughed again for Corn, it may do well enough when it is mixed with other seeds, though the cattle are not very fond of it green, unless when it is very young. The large sort is the most profitable, but this is rarely to be had without a mixture of the small kind, and also of the smaller Melilot, which is commonly called None-such, or sometimes Black Seeds, for those who save the seeds for sale, are seldom curious enough to distinguish the sorts; but where the beauty of the verdure is considered, there must not be any of these seeds sown, because their yellow heads of flowers are very unsightly among the Grass; and if it is in gardens where the Grass is constantly mowed, the flowers of these plants will come out near the root in such clusters, as to occasion large, unsightly, yellow patches; and as the heads decay they turn brown, and have a very disagreeable appearance.

The fifth sort grows naturally on chalky lands in many parts of England, and in some counties the seed is sown after the same manner as the common red Clover, especially on chalky ground, where it will thrive, and produce a better crop than Clover. The stalks of this are hairy, and grow erect to the height of two feet or more, and are garnished with trifoliate leaves, standing upon long foot-stalks, whose lobes are longer than those of the red Clover, and have no marks of white; they are of a yellowish green colour, and are covered with soft hairs. The flowers grow in oval spikes at the end of the branches, they are of a pale copper colour; their petals are long and tubulous, but the brim is divided into two lips as the other sorts. It flowers and ripens its seeds about the same time as the common Clover.

This is known by the title of Trefoil in the places where it is cultivated, but the seedsmen sell the Hop Clover by that name; so they make no distinction between this, the Hop Clover, and None-such; therefore, by which of these three titles the seeds are bought, they prove the same. This sort of Trefoil is much cultivated in that part of Essex which borders on Cambridgeshire.

The sixth sort grows naturally in Spain and Italy; this has upright stalks near two feet high, which are hairy, and garnished with trifoliate leaves, having roundish lobes which are sawed at their points. The flowers are produced at the top of the stalk, in long, obtuse, hairy spikes; they are of a bright red colour, so make a pretty appearance during their continuance. It is an annual plant, so is not proper for sowing with Grass, otherwise it makes good fodder.

The seventh sort is an annual plant, which grows naturally in the south of France and Italy; it rises with a strong herbaceous stalk near three feet high, which is smooth, and garnished with trifoliate leaves, whose lobes are two inches and a half long, and near a quarter broad, standing upon long foot-stalks, which are embraced by stipulæ or sheaths their whole length. The flowers are produced at the top of the stalks in very long spikes; they are of a beautiful red colour, so make a fine appearance. It flowers in July, and the seeds ripen in autumn.

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The eighth sort grows naturally in Spain and Italy; this rises with a slender stiff stalk near two feet high, garnished with trifoliate leaves, whose lobes are very narrow like Grass, and are hairy. The flowers are produced at the top of the stalks in oblong conical spikes; the indentures of their empalements end in long bristly hairs, which are almost equal in length; the spikes are hairy, and the flowers of a pale red colour. It flowers and ripens its seeds about the same time as the former.

The ninth sort is the common Hare's-foot Trefoil, which grows naturally upon dry gravelly land in most parts of England, and is a sure indication of the sterility of the soil, for it is rarely seen upon good ground. This plant is seldom eaten by cattle, so is unfit for pasture, and is only mentioned here because it is sometimes used in medicine; it is an annual plant, whose root decays soon after it has perfected seeds.

The tenth sort grows naturally on arable land in many parts of England; this has trailing stalks which put out roots at their joints. The leaves stand upon long slender foot-stalks; the lobes are roundish, and are sawed on their edges; the flowers are collected in roundish heads, standing upon slender foot-stalks, which rise from the wings of the stalks; these have bladder empalements which terminate in two teeth. When these lie on the ground, their globular heads, having a little blush of red on their upper side toward the sun, and the other part being white, have a great resemblance of Strawberries, and from thence it was titled Strawberry Trefoil.

These sorts are frequently preserved in gardens for the sake of variety; they are easily propagated by seeds, which may be sown in an open bed of ground, either in autumn or spring. The plants which come up in autumn, will grow much larger, and flower earlier in the summer than those which are sown in the spring; so from those good seeds may be always obtained, whereas the other sometimes miscarry. When the plants come up, they require no other care than to keep them clean from weeds, and thin them where they are too close.

The eleventh sort is the common Melilot which is used in medicine; it grows naturally among the Corn in many parts of England, particularly in Cambridgeshire in great plenty, where it is a most troublesome weed; for in reaping, it is scarce possible to separate it from the Melilot, so that it is carried in with the Corn; and the seeds of the Melilot being ripe about the same time with the Corn, they are threshed out with it, and being heavy are difficult to separate from it; and when a few of the seeds are ground with the Corn, it spoils the flour; for the bread, or whatever else is made with it, will have a strong taste like Melilot plaster.

The roots of this plant are strong and ligneous, from which spring out several stalks which rise from two to four feet high, according to the goodness of the land. The stalks branch out, and are garnished with trifoliate leaves, having oval sawed lobes of a deep green colour. The flowers are produced in long slender spikes which spring from the wings of the stalks; they are of a bright yellow, and shaped like the other butterfly flowers; these are succeeded by naked seeds which ripen in August.

The twelfth sort grows naturally in Bohemia and Austria, but has been long cultivated in England as a medicinal plant, though at present it is rarely used; it is annual. The stalks are large, hollow, and channelled; they rise about a foot high, and send out many branches, which are garnished with trifoliate leaves, whose lobes are oval and slightly sawed on their edges, standing upon pretty long foot-stalks. The flowers are collected in oblong spikes, which stand upon very long foot-stalks, springing from the wings of the stalks at every joint the whole length of the stalk; they are of a pale blue colour, and shaped like those of the common Melilot; these appear in June and July, and are succeeded by small yellow seeds of a kidney shape, two or three being included in each

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short pod; these ripen the beginning of September. The whole plant has a very strong scent like that of Fenugreek, and perishes soon after the seeds are ripe. If the seeds of these sorts are permitted to scatter, the plants will rise without care, and require no other culture but to keep them clean from weeds, and thin them where they grow too close.

TRIGONELLA. Lin. Gen. Plant. 804. Fœnum Græcum. Tourn. Inst. R. H. 409. tab. 230. Fenugreek.

The CHARACTERS are,

The empalement of the flower is bell-shaped, of one leaf, cut at the top into five almost equal segments. The flower is of the butterfly kind; the standard is oval, obtuse, and reflexed; the two wings are oblong, reflexed, and spreading flat like the standard, so as outwardly to appear like a regular flower of three petals; the keel is very short, obtuse, and occupies the navel of the flower. It has ten short rising stamina, nine of which are joined, and one stands separate, terminated by single summits, and an oval oblong germen, supporting a single style, crowned by a rising stigma. The germen afterward turns to an oblong oval pod compressed, and close filled with kidney-shaped seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which includes those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. TRIGONELLA (*Fœnum Græcum*) leguminibus sessilibus strictis erectiusculis subfalcatis acuminatis caule erecto. Hort. Cliff. 229. *Trigonella with scythe-shaped acute pods which are close, erect, and sit close to the stalks, which are erect.* Fœnum Græcum sativum. C. B. P. 348. *Common or cultivated Fenugreek.*
2. TRIGONELLA (*Spinosa*) leguminibus subpedunculatis congestis declinatus subfalcatis compressis pedunculis communibus spinosis brevissimis. Lin. Sp. 1094. *Fenugreek with foot-stalks to the pods, which are sickle-shaped and compressed, and the common foot-stalks with short spines.* Fœnum Græcum sylvestre polyceration Creticum majus. Breyn. Cent. 79. *Greater Cretan Fenugreek with many pods.*
3. TRIGONELLA (*Polycerates*) leguminibus sessilibus arcuatis confertis, caulibus procumbentibus. *Trigonella with arched pods growing in clusters, which sit close to the stalks and trail on the ground.* Fœnum Græcum sylvestre alterum polyceration. C. B. P. 348. *Another wild Fenugreek with many pods.*
4. TRIGONELLA (*Platycarpus*) leguminibus pedunculatis congestis pendulis ovalibus compressis, caule diffuso, foliolis subrotundis. Hort. Upsal. 229. *Trigonella with clustered, oval, compressed, hanging pods, having foot-stalks, diffused stalks, and roundish lobes.* Melilotus supina latifolia siliquâ latâ membranaceâ compressâ. Amman. Ruth. 151. *Low broad-leaved Melilot, with broad, compressed, membranaceous pods.*
5. TRIGONELLA (*Ruthenica*) leguminibus pedunculatis congestis pendulis linearibus rectis, foliolis sub lanceolatis. Lin. Sp. Plant. 776. *Trigonella with linear strait pods which hang down, and grow in clusters upon foot-stalks, and spear-shaped lobes to the leaves.* Melilotus supina angustifolia, medicæ folio, siliquâ compressâ. Amman. Ruth. 119. *Low narrow-leaved Melilot with the appearance of Medick, and a compressed pod.*

The first sort is the common Fenugreek, whose seeds are used in medicine. Where this plant grows naturally is uncertain, but it is cultivated in the fields in the south of France, and in Germany, from whence great quantities of the seeds are annually imported here for use.

It is an annual plant, which rises with a hollow, branching, herbaceous stalk, a foot and a half high, garnished with trifoliate leaves placed alternately, whose lobes are oblong, oval, indented on their edges, and have broad furrowed foot-stalks. The flowers come out singly at each joint from the wings of the stalk; they are white, of the butterfly kind, and sit very close to the stalk; these are succeeded by long compressed pods shaped somewhat like a broad sword,

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ending in long points, having a broad membrane on one edge; these are filled with square yellow seeds, indented on one side like a kidney. The whole plant has a very strong odour.

This plant has not as yet been cultivated in any quantity for use in England, as it has generally proved a very uncertain crop, occasioned by the inconstancy of the weather here, for in cold wet seasons the plants are frequently killed before the seeds ripen; and if any of them live long enough to perfect their seeds, the pods change of a dirty colour, and the seeds turn black and unsightly, when much rain falls about the time of their ripening; therefore the seeds which are imported from the continent, are always preferred to those of our own growth.

But as the consumption of these seeds is very great in England, there are some persons who are inclinable to make fresh trials to cultivate the plants here, and, as I have many years cultivated this in small quantities, and have made trials by sowing the seeds at different seasons, and after various manners, by which I have acquired a knowledge of its culture, I shall here give such directions for the management of this plant, as from experience has been found to succeed best.

The ground in which this plant thrives best, is a light hazel loam, not enriched with dung; this should be made clean from the roots of weeds, and well ploughed twice, and harrowed fine before the seeds are sown. The best time to sow the seeds is the latter end of September or beginning of August; these should be sown in shallow drills like Peas. The rows should be two feet asunder, and the seeds must be scattered one inch distant from each other in the drills; for if the plants are too close together in the spring, they may be easily thinned with the hoe when the ground is cleaned. If the seeds are sown at the before-mentioned time, the plants will appear in three weeks or a month after; and if the weeds appear at the same time, the ground should be hoed over as soon as possible in dry weather, to destroy the weeds; and when the plants are grown an inch high, the earth should be drawn up to their stems in the same manner as is practised for Peas. This will secure their stems from being injured by sharp cutting winds; and if a ridge of earth is drawn up on the north or east side of each row, it will protect the plants from the pinching winds which blow from both those quarters; for although this plant will not be in any danger from the frost in the ordinary winters, yet in very severe frosts they are sometimes killed; but as this plant will live in any situation, where Peas stand through the winter, there will be no greater hazard of the one crop than the other.

In the spring of the year the ground must be hoed again in dry weather to kill the weeds, and the plants should be again earthed up in the like manner as Peas, with whose culture this plant will thrive; but there must be great care taken to keep the ground as clean from weeds as possible, for if they are permitted to grow, they will soon advance above the plants, and greatly weaken them; and when their pods begin to form, they cannot be too much exposed to the sun and air, whereby they will be less liable to suffer from moisture.

When the seeds are sown in autumn, the plants will grow much stronger, and have many more side branches than those which come up in the spring, so will produce a much greater crop of seeds, and these will produce their flowers five or six weeks earlier, so will have a better season to ripen; but in order to have them better ripened, the top of the plants should be cut off with garden shears about the middle of June, by which time the pods will be formed on the lower part of the stalks, which will be greatly forwarded by topping of the stalks in the same way as is commonly practised for garden Beans; for where the plants are suffered to extend in length, the lower pods often miscarry, or are less nourished, and those on the top of the stalks are late before they ripen; so where the topping of the plants is omitted, the pods at bottom will open and cast out their seeds, before those

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above will be ripe; therefore to preserve the first and cut off the other, will be found the best method; for by so doing, the pods will ripen equally, and much earlier in the season.

If the summer proves warm, the seeds will ripen in August, and the plants should then be cut off, and laid to dry for five or six days, in which time they should be turned two or three times, that the pods may dry equally; then the seeds may be either threshed out in the field, or the haulm may be housed in a barn, to be threshed at a more convenient time.

The second sort grows naturally in Crete. The stalks of this are slender, and rise a foot high, sending out several slender branches, which are garnished with trifoliate leaves whose lobes are wedge-shaped, and sawed at their ends, where they are indented; these stand upon slender foot-stalks. The flowers are produced in clusters from the sides of the branches upon short foot-stalks, which stand erect, being armed with short spines; the flowers are small, of a pale colour, and are succeeded by narrow pods standing parallel and erect. This is an annual plant which flowers in July; the seeds ripen the end of August, and the plants decay soon after.

The third sort grows naturally in Spain and Italy; this is also an annual plant, whose roots decay soon after the seeds are ripe. The stalks trail upon the ground, and extend a foot and a half in length, sending out several side branches; these are garnished with small trifoliate leaves, whose lobes are wedge-shaped and sawed at their points. The flowers are produced in clusters at the wings of the stalk; they are small, of a pale yellow colour, and sit very close to the stalks; these are succeeded by short hooked pods, which sit close to the stalks in clusters, spreading out every way. It flowers in July, and the seeds ripen in autumn. The fourth sort grows naturally in Siberia. The root of this is biennial; the stalks trail upon the ground, and extend a foot in length, sending out many side branches; these are garnished with trifoliate leaves, having roundish lobes, which are sawed on their edges. The flowers come out from the wings of the stalks upon foot-stalks, growing in clusters; they are small, of a yellowish white colour, and are succeeded by oval compressed pods, containing two seeds in each. It flowers in June, and the seeds ripen in September.

The fifth sort also grows naturally in Siberia; this is also a biennial plant, whose roots decay soon after the seeds are ripe. The stalks of this are very slender, and trail upon the ground; they extend a foot and a half in length, and divide into several branches. The leaves are trifoliate; the lobes are wedge-shaped, indented at the point, and sawed; they are narrower than either of the former. The flowers are produced in clusters upon slender foot-stalks, which spring from the wings of the stalk; they are small, and of a bright yellow colour; these are succeeded by narrow erect pods, which contain three or four small seeds. This flowers and perfects its seeds about the same time as the former. The seeds of both these plants were sent me by the late Dr. Amman, Professor of Botany at Petersburg.

These plants are frequently cultivated in gardens for the sake of variety, but I do not know any use is made of either of the sorts except the first. The seeds of these should be sown in the places where the plants are designed to stand, for they will not bear transplanting. If they are sown in autumn, in the same way as is before directed for the first sort, the plants will come earlier to flower, and good seeds may be obtained with more certainty than from the spring plants. All the culture these require is to thin them where they stand too close, and keep them clean from weeds. A few plants of each sort in a garden will be sufficient, as they have no great beauty.

The seeds of the first sort are very rarely used for internal medicines, but are much used in fomentations, bathings, and cataplasms, and also in emollient glysters, being ripening, dissolving, and anodyne, and good

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good for all kinds of tumours and swellings, to which purpose the farina or powder is very effectual. Farriers and grooms make much use of it in drinks for horses; but these seeds are too hard to be pounded in a mortar, so they should be ground in a mill.

TRILLIUM. Lin. Gen. Plant. 412. Solanum. C. B. P. American Herb Paris.

The CHARACTERS are,

The flower has a three-leaved spreading empalement which is permanent, and three oval petals which are very little larger than the empalement; it has six axel-shaped stamina which are shorter than the petals, erect, and terminated by oblong summits which are the length of the stamina, and a roundish germen with three slender styles which are recurved, crowned by single stigmas. The germen afterward becomes a roundish berry with three cells, filled with roundish seeds.

This genus of plants is ranged in the third section of Linnæus's sixth class, which includes those plants whose flowers have six stamina and three styles.

The SPECIES are,

1. TRILLIUM (*Cernuum*) flore pedunculato cernuo. Lin. Sp. Plant. 339. *Trillium with a nodding flower growing upon a foot-stalk. Solanum Triphyllum, flore hexapetalo carneo. Catefb. Car. vol. i. p. 45. Three-leaved Nightshade, with a flesh-coloured flower having six petals.*
2. TRILLIUM (*Erectum*) flore pedunculato erecto. Lin. Sp. Plant. 340. *Trillium with a flower growing erect upon a foot-stalk. Solanum triphyllum Canadense. Cornut. 166. Three-leaved Canada Nightshade.*
3. TRILLIUM (*Sessile*) flore sessili erecto. Lin. Sp. Plant. 340. *Trillium with an erect flower having no foot-stalk. Solanum triphyllum flore hexapetalo tribus petalis purpureis, cæteris viridibus reflexis. Catefb. Car. i. p. 50. Three-leaved American Nightshade with a flower of six petals, three of which are purple-coloured, and the other green and reflexed.*

These plants grow naturally in the woods in many parts of North America; the first was sent me from Philadelphia by Dr. Bensel, who found it growing in plenty there. The root of this plant is tuberous, sending out many fibres; the stalk is single, naked, and rises five or six inches high, with three oval leaves placed at the top upon short foot-stalks, which spread out in a triangle; these are two inches long, and an inch and a half broad, smooth, and of a deep green colour. From the center of the foot-stalks of the three leaves comes out one flower upon a short foot-stalk, which nods downward; this has a three-leaved green empalement which spreads open, and within are three petals about the size of the empalement; they are of a whitish green on their outside, and purple within, having six stamina in the center, surrounding the style, which have oblong summits. The flowers of this appear in April, and are succeeded by roundish succulent berries, having three cells filled with roundish seeds, which ripen in June.

The second sort has a taller stalk than the first. The three leaves are placed at a distance from the flower, which stands upon a long foot-stalk, and is erect; the petals of the flower are larger, and end with sharper points.

The third sort grows in shady thickets in Carolina. The stalk of this is purple; the three leaves grow at the top like the first, but they are much longer, and end in acute points; the petals of the flowers are long, narrow, and stand erect.

These plants are propagated by seeds, which should be sown upon a shady border soon after they are ripe, and then the young plants will come up the next spring; but if the seeds are sown in the spring, they will remain in the ground a year. When the plants come up they must be kept clean from weeds, and in autumn, after their leaves decay, the roots may be transplanted to a moist shady place, where they are to remain.

TRIOSTEUM. Lin. Gen. Plant. 211. Trioestespermum. Dillen. Hort. Elth. Dr. Tinkar's Weed, or false Ipecacuana.

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The CHARACTERS are,

The flower has a permanent empalement of one leaf, cut into five segment which are the length of the petal; and a tubulous flower of one petal, with a short brim cut into five parts which stand erect; and five slender stamina the length of the tube, terminated by oblong summits, with a roundish germen supporting a cylindrical style, crowned by a thick stigma. The germen afterward becomes an oval berry with three cells, each including one hard, three-cornered, obtuse seed.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. TRIOSTEUM (*Perfoliatum*) floribus verticillatis sessilibus. Lin. Sp. Plant. 176. *Trioesteum with flowers growing in whorls, and sitting close to the stalks. Trioestespermum latiore folio, flore rutilo. Hort. Elth. Broad-leaved Trioestespermum with a reddish flower, commonly called Dr. Tinkar's Weed, or false Ipecacuana.*
2. TRIOSTEUM (*Angustifolium*) floribus oppositis pedunculatis. Lin. Sp. Plant. 175. *Trioesteum with flowers growing opposite, having foot-stalks. Periclymenum herbaceum rectum Virginianum. Pluk. Alm. 287. Upright, herbaceous, Virginian Honeyfuckle.*

The first sort grows naturally in the woods in most parts of North America; this has a root composed of thick fleshy fibres, which are contored and rough, from which spring several strong herbaceous stalks, rising a foot and a half high, garnished at each joint by two oblong broad leaves embracing the stalk. From the bosoms of these come out the flowers in whorls, sitting very close to the stalks; these have empalements which are cut into five segments. The flowers are small, tubulous, and cut slightly at the brim into five obtuse segments; they are of a dark red colour, inclining to purple; these appear the beginning of June, and are succeeded by roundish berries, which turn yellow when ripe; they have three cells, in each of which is contained one hard seed. The root is perennial, but the stalks decay every autumn.

The second sort differs from the first in its leaves being longer and narrower. The flowers stand single upon short foot-stalks, and there are but two at each joint, whereas the other has many growing in whorls round the stalks; but the roots of both are indifferently used in America by the title of Dr. Tinkar's Weed.

Both these plants are natives of New England, Virginia, and some other northern parts of America, where their roots have been frequently used as an emetic, and are commonly called Ipecacuana. One of the first persons who brought their roots into use was Dr. Tinkar, from whence many of the inhabitants have called them by the name of Dr. Tinkar's Weed. The leaves of the first sort greatly resemble those of the true Ipecacuana, but the roots are of a different form; but so far as I can judge by the imperfect fruit of a specimen in my collection of the true Ipecacuana, as also by the figure and description given by Piso in his History of Brasil, it seems to belong to this genus.

The first sort grows on low marshy grounds, near Boston in New England, very plentifully, where the roots are taken up every year, and are continued in use amongst the inhabitants of Boston.

This plant is preserved in several curious gardens in England, and is hardy enough to thrive in the open air, but it should be planted on a moist light soil; for if it is on dry ground, there must be care taken to water the plants constantly in dry weather, otherwise they will not thrive. It may be propagated by seeds, which should be sown on a border of light earth, where the morning sun only comes on it; but if the seeds are sown in the spring, they will remain in the ground a whole year before the plants will come up, so that during this time the border must be constantly kept clear from weeds; and the following spring, when

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the plants appear, they should be duly watered in dry weather, which will greatly promote their growth; but if the seeds are sown in autumn, the plants will come up the following spring. They must be constantly kept clean from weeds, which, if permitted to grow amongst them, will soon overbear the plants while they are young, and either quite destroy them, or so much weaken them, that they will not recover in a long time.

The plants may remain in this seed-border until the Michaelmas following, when they should be carefully taken up, and transplanted where they are designed to remain. Some of them should be planted in pots, that they may be sheltered in winter while young, lest those which are in the full ground should be destroyed by severe frost.

This plant may be also propagated by parting of the roots. The best season for this work is in the spring, just before the plants begin to shoot, which is commonly about the middle or latter end of March; but in doing of this, the roots must not be parted too small, for that will prevent their flowering strong.

These plants perfect their seeds in this country every year, which, if sown in autumn as soon as they are ripe, the plants will come up the following spring, by which means a whole year will be saved. The seedling plants will not flower until the third year, and then they are seldom so strong as the older plants.

TRIPETALOUS FLOWERS are such as consist of three leaves, which are called petals, to distinguish them from the leaves of plants.

TRIPOLIUM. See **ASTER.**

TRITICUM. Tourn. Inst. R. H. 512. tab. 292, 293. Lin. Gen. Pl. 99. Wheat; in French, *Froment*.

The **CHARACTERS** are,

It has an oval chaffy empalement with two valves, which inclose two or three flowers. The petals have a double valve as large as the empalement; the outer valve is bellied and acute-pointed, the inner is plain. The flowers have three hair-like stamina terminated by oblong forked summits, and a top-shaped germen supporting two hairy reflexed styles, crowned by feathery stigmas. The germen afterward becomes an oval oblong seed, obtuse at both ends, convex on one side, and channelled on the other, wrapped up in the petal of the flower.

This genus of plants is ranged in the second section of Linnæus's third class, which contains those plants whose flowers have three stamina and two styles.

The **SPECIES** are,

1. **TRITICUM** (*Hybernum*) calycibus quadrifloris ventricosus lævibus, imbricatis submutis. Hort. Upsal. 21. *Wheat with beards, having smooth, bellied, imbricated husks, with four flowers. Triticum hybernum aristis carens. C. B. P. 21. Winter Wheat without awns, or common Wheat.*
 2. **TRITICUM** (*Æstivum*) calycibus quadrifloris ventricosus glabris imbricatis aristatis. Hort. Upsal. 21. *Bearded Wheat with smooth imbricated bellies, and four flowers in each chaff. Triticum æstivum. C. B. P. 21. Summer or Spring Wheat.*
 3. **TRITICUM** (*Turgidum*) calycibus quadrifloris ventricosus villosis imbricatis subaristatis. Hort. Upsal. 21. *Wheat with hairy, bellied, imbricated, obtuse husks, containing four flowers. Triticum spicâ villosâ quadratâ, brevior & turgidior. Mor. Hist. 3. p. 176. Wheat with four-cornered, short, hairy, turgid spikes, commonly called gray Pollard, or Duckbill Wheat.*
 4. **TRITICUM** (*Quadratum*) glumis ventricosus villosis imbricatis spicis oblongis pyramidatis. *Wheat with hairy, bellied, imbricated husks, and oblong pyramidal spikes. Triticum spicâ villosâ quadrata longior, aristis munitum. Mor. Hist. 3. p. 176. Wheat with longer, four-rowed, hairy spikes armed with beards, commonly called Cone Wheat.*
 5. **TRITICUM** (*Polonicum*) calycibus bifloris nudis, flosculis longissime aristatis, rachis dentibus barbatis. Lin. Sp. Plant. 127. *Wheat with two flowers in each cup, which are long, naked, and bearded. Triticum Polonicum. Pluk. Phyt. 231. f. 6. Polish Wheat.*
- There are some other varieties of Wheat, which the farmers in different parts of England distinguish by

different titles, but they are only feminal variations, which have risen from culture. Some of these differ in the colour of their chaff, and others in the form of their spikes; but as they are subject to vary, we shall not enumerate them as different species. These are, The red Wheat without awns, the red-eared bearded Wheat, many-eared Wheat, and naked Barley. The five sorts above enumerated I have sown several years, and have always found them constant without variation.

Where Wheat grows naturally is very hard to determine at present; but it is generally supposed that Africa is the country, because in the earliest accounts we have of it, there is mention of its being transported from thence to other countries, and Sicily was the first country in Europe where this grain was cultivated; but although the country of its natural growth is in a very warm climate, it is found to bear the inclemency of our rough climate very well; and in more northern countries, where the summers are long enough to ripen the grain, it is found to succeed. The first sort is the common Wheat which is sown in most parts of England, and is so well known as to need no description. The spikes or ears of this are long; the grains are ranged in four rows, and lie over each other like the scales of fish; the chaff is smooth, bellied, and is not terminated by awns or beards.

The second sort is called Summer or Spring Wheat; this will ripen much earlier than the other, so has often been sown in the spring of the year, at the same time with Oats; but if the season proves wet, it is very subject to grow tall, and have very thin grains, which has discouraged people from sowing it at that season; so that, unless from the severity of the winter, or some other accident, the winter Corn is injured, the practice of sowing Wheat in the spring is rarely used.

The third sort is called in some places Gray Wheat, in others Duckbill Wheat and gray Pollard, but in Suffex it is generally known by the title of Fullers Wheat; this sort grows very tall, and if it is sown too thick, is very apt to lodge with rain and wind, for the ears are large and heavy; they nod on one side as the grain increases in weight. The awns are long, the chaff hairy, which detains the moisture, all which help to lodge it, for which reason many people do not chuse to cultivate this sort; but where the roots are at a proper distance from each other, they will put out many stalks from each, and the stalks will be stronger, and support themselves better, and the grain produces more flour in proportion than any of the other sorts. The awns of this sort always drop off when the grain is full grown.

The fourth sort is more cultivated in Oxfordshire and Berkshire than in any other part of England. The ears of this sort are formed like a cone, ending with a slender point, from whence it had the title of Cone Wheat. Of this there are the white and red, which I believe are only varieties, for I have generally seen them mixed in the field. The awns of this are long and rough, so the farmers say it guards the grain from birds, which has been a recommendation to sow it, especially near inclosures, where there is a shelter for birds. Mr. Tull prefers this sort for sowing in drills, but I have seen the third sort answer much better in the horse-hoeing husbandry.

The Polish Wheat grows tall, the ears are long and heavy, so that where it is sown too thick, it is very subject to be lodged; therefore the farmers little regard it; but it produces much flour, and therefore worthy of cultivation.

The season for sowing of Wheat is autumn, and always when the ground is moist. In the downs of Hampshire, Wiltshire, and Dorsetshire, the farmers begin sowing of their Wheat in August, if there happens rain; so that when they are in their harvest, if the weather stops them, they employ their people in sowing, for if the Corn is not forward in autumn, so as to cover the ground before winter, it seldom succeeds well on those dry lands, especially if the spring should prove dry; but in the low strong lands, if they

get their Wheat into the ground by the middle of November, the farmers think they are in good season; but sometimes it so happens, from the badness of the season, that in many places the Wheat is not sown till Christmas or after, but this late-sown Wheat is subject to run too much to straw, especially if the spring should prove moist.

The usual allowance of seed Wheat to one acre of land is three bushels, but from repeated experiments, it has been found, that less than half that quantity is more than sufficient; therefore, if the farmers have regard to their own interest, they should save this expence of seed, which amounts to a considerable article in large farms, especially when it is to be purchased, which most of the skilful farmers do, at least every other year, by way of change; for they find that the seeds continued long upon the same land will not succeed so well, as when they procure a change of seeds from a distant country. And the same is practised by the husbandmen of the Low-Countries, who commonly procure fresh seeds from Sicily every second or third year; which they find succeed better with them, than the seeds of their own country. In the choice of the seeds, particular regard should be had to the land upon which it grew, for if it is light land, the Wheat which grew upon strong land is the best, and so vice versa.

There have been some persons in England curious enough to procure their seed Wheat from Sicily, which has succeeded very well, but the grain of this has proved too hard for our English mills to grind, which has occasioned their neglecting to procure their seeds from thence; nor do I think there can be much advantage in procuring the seeds from abroad, since the lands of England are so various, as to afford as much change of seeds as will be necessary. And the less we purchase from abroad, the greater will be the saving to the public; so that it should be the business of skilful farmers to want as few seeds as possible, since, by exchange with each other, they may so contrive, as not to part with ready money for any seeds. The land which is usually allotted for Wheat, is laid fallow the summer before the Corn is sown; during which time it is ploughed two or three times, to bring it into a tilth; and the oftener and better the ground is ploughed, and the more it is laboured with harrows between each ploughing to break and divide the clods, the better will be the crop, and the fewer weeds will be produced. But in this article most of the farmers are deficient, for after they have given their lands one ploughing, they frequently leave it to produce weeds, which sometimes are permitted to stand until they shed their seeds, whereby the ground will be plentifully stocked with weeds; and as an excuse for this, they say that these weeds will supply their sheep with some feed, and the dung of the sheep will mend their land; but this is a very bad piece of husbandry, for the weeds will draw from the land more than the dung of the sheep will supply; so that it is undoubtedly the best method to keep the ground as clean from weeds as possible, and to stir it often to separate and break the clods, and render the land fine; and where the land can enjoy a winter's fallow, it will be of much greater service to it than the summer; and by thus labouring of the land, it will be of equal service to it as a dressing of dung. Therefore if the farmers could be prevailed on to alter their method of husbandry, they would find their advantage in it; for the expence of dressing in some countries is so great, as to take away the whole profit of the crop.

There is also a very absurd method in common practice with the farmers, which is the carrying out of their dressing, and spreading it on the land in the summer, where it lies exposed till the sun has dried out all the goodness of it, before it is ploughed into the ground, so that the dressing is of little value; therefore the dung should never be laid on the land faster than it can be ploughed in, for one load of dung so managed, is better than three in their usual method.

As Wheat remains a longer time upon the ground than most other sorts of Corn, it requires a greater stock of nourishment to lengthen and fill the ears: therefore, if the dressing is exhausted in winter, the Corn will have but short ears, and those but lean, nor will the grain afford much flour; so that it frequently happens, that a light dressing of foot in the spring, at the time the Wheat is beginning to stalk, proves of greater service to the crop, than a dressing of dung laid on the land before it is ploughed, especially if the dung is not very good. Deep ploughing (where the staple of the ground is deep enough to admit of it) will also be of great service to the Corn, for the small fibres of the roots, which are the mouths that supply the nourishment, extend themselves very deep into the ground. I have traced many of them upward of three feet, and believe they spread much farther where the ground is light; therefore it is of great advantage to the crop to have the ground stirred and loosened to a proper depth, for by so doing the roots will find a supply of pasture for the nourishment and augmentation of the ears, at the time they are forming, when it is most required; for if the ground is ploughed shallow, the roots will have extended themselves to that depth by the spring, so that when the nourishment is wanted to supply the stalks, the roots are stinted by the hardness of the soil, which they cannot penetrate; when this is the case, the colour of the blade is frequently seen to change in April, and seldom recovers its verdure again; and when this happens, the stalks are always weakened in proportion to the decay of the blade; for it is well known from long experience, that the leaves or blade of Corn, are necessary to draw in nourishment from the air and dews, for the increase of the stalk and ear; but in order to ascertain this, I have made trial of it, by cutting off the leaves of some roots of Wheat alternately, early in the spring, and have constantly found the stalks upon those roots much smaller, the ears shorter, and the grain thinner than those of the intermediate roots, whose blades were not cut. This shews the absurdity of that practice of feeding sheep upon Corn in the winter and spring. I have frequently seen in some gardens, plants divested of their lower leaves, which ignorant persons have supposed to draw away the nourishment from the head; but wherever this has been practised, I have always seen the plants have been greatly weakened by it; so that until those leaves decay naturally, they should never be taken off.

Of late years, many composts have been advertised for the steeping of the seeds of Corn, in order to improve their growth, some of which have been sold at a dear rate; but as so great success was assured by the inventors to those who should make use of them, there were numbers of persons who made the trial; but so far as I have been able to get information of their experiments, they did not succeed so well as to encourage the use of these compositions; and from several trials which I made myself with great care, I always found, that the Wheat which had been steeped in these compositions came up sooner, and grew much ranker in the winter, than that which had not been steeped; but in the spring the unsteeped Wheat had a greater number of stalks to each plant, and the ears were better fed than those which had been steeped; therefore these sorts of composts have been found of no real use to the crop.

My experiments were made in the following manner. The Wheat was sown in drills, on the same spot of ground; the seeds which had been steeped were sown in alternate rows, and the intermediate rows were sown with unsteeped Corn. The rows were a foot and a half asunder, and the grains were all taken out of one measure, and sown as equally as possible: the steeped Corn appeared above ground three days before the other, and continued to grow faster than the unsteeped Corn during the winter, but in the spring the blade of the steeped Corn changed its colour, and their points became of a brown colour, when I gave a
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light dressing to one of the rows, which soon recovered its verdure, and caused it to be the strongest row of the whole; but the others which had not this dressing, produced weaker stalks and ears than that which was not steeped.

I have before observed, that in general the farmers sow more than double the quantity of Corn on their lands than is necessary; therefore there is a great waste of grain, which in scarce years amounts to a considerable sum in large farms, and to a whole country, it is an object worthy the attention of the public: but I fear whatever may be said to prevent this, will have but little weight with the practitioners of agriculture, who are so fond of old customs, as rarely to be prevailed upon to alter them, though they are extremely absurd. But if these people could be prevailed on to make the trial with care, they must be soon convinced of their error; for if they would but examine a field of Corn sown in the common way, they will find but few roots which have more than two or three stalks, unless by chance, where there may be some few roots which have room to spread, upon which there may be six, eight, or ten stalks, and frequently many more; but in a field of Wheat which had not a greater allowance than one bushel of Corn to an acre, so that the roots had room to spread, I have observed the roots produced from six to twelve, or fourteen stalks, which were strong, and had long well nourished ears, and the produce was much greater than in any of those fields in the neighbourhood, which were sown with the common allowance. And if the land is good, and the roots stand at a proper distance from each other, there will be few roots which will not produce as many stalks as I have here mentioned, and the ears will be better nourished.

But if the land is not covered with the blades of Corn by the spring, the farmers think they shall have no crop; whereas, if they would have patience to wait till the roots put out their stems, they would soon be convinced of the contrary; especially if they could be prevailed on to draw a weighty roller over the Wheat in March, which will cause it to spread; and by settling of the loose ground to the roots, the drying winds in the spring would be prevented from penetrating to their fibres, so that the roots will produce the more stalks; but before this operation, it will be proper to have the Corn cleaned from weeds, if these are permitted to grow, they will draw away much nourishment from the Corn; and if, at this season, the land is made clean from weeds, the Corn will soon after spread and cover the ground, whereby the growth of weeds will be greatly lessened.

There is not any part of husbandry which requires the farmer's attention more, than that of keeping his land clean from weeds; and yet there are few who trouble themselves about it, or who understand the proper method of doing it; few of them know those weeds which are annual, so as to distinguish them from those which are perennial; and without this knowledge, it will be much more difficult for a person to clean his land, let his industry be ever so great, for annual weeds may be soon destroyed if taken in time; whereas, if they are neglected, their seeds will soon ripen and scatter; after which it will require three times the labour and expence to get rid of them, as would have been sufficient at the beginning, and then the crop would have had no bad neighbours to rob it of its nourishment. The common method now practised is a very absurd one, for the weeds are left to grow till the Wheat is beginning to ear, and the weeds are in flower; so the ground being covered by the Corn, all the low weeds are hid, and these are left to ripen and scatter their seeds; the tall weeds only are taken out, and if the people employed are not careful, many of these will escape them, as they will be so intermixed with the stalks of Wheat as not to appear, unless diligently sought after. By this method the weeds of tall growth are permitted to stand, and rob the Corn of its nourishment, dur-

ing the principal time of its growth, and the humble weeds are never destroyed; and by going amongst the stalks when they are tall, great numbers of them are broken and trod under the work-people's feet; yet however obvious this is to every farmer, none of them have thought of altering this practice. I would therefore recommend a method which is now in common practice amongst the kitchen gardeners, which has been found of great benefit to their crops, and has also been a great saving to them in the expence of weeding; and this is making use of hoes for cleaning the Wheat early in the spring, before the ground is covered with blades of Corn. With this instrument, all the low as well as the tall weeds will be cut up, and if it is performed in dry weather, the weeds being then small will soon die. Where the ground happens to be very full of weeds, it may be necessary to go over it a second time, at about a fortnight after the first, to cut up any weeds which may have before escaped. By laying the ground clean at this time, the Corn will not be robbed of its nourishment; and there will not be time for the weeds to grow so as to prejudice it much after, for the ground will be so much shaded by the Corn, as to keep down the weeds, so that they cannot have time to ripen their seeds before harvest.

If, at the time of this operation, the roots of Corn are cut up where they are too close, it will be found of great service to the other; but this, I fear, few of the old farmers will ever agree with me in; tho' what I mention is not from theory but experiments, which have been repeated with great care; and where it was practised the produce of twenty rods of ground, was much greater both in weight and measure, than the same quantity of ground in the best part of the field where this was not practised, and the stalks stood upright, when a great part of the Corn in the same field was lodged.

I have often observed in those fields where foot-paths are made through Corn-fields, that by the side of those paths where the Corn is thin, and has been trodden down in the winter and spring, that the stalks have stood erect, when most of the Corn in the same field has been laid flat on the ground; which was owing to the stalks being so much stronger from their having more room, the other having been drawn up tall and slender by being so close together. There is also another great advantage in keeping Corn clean from weeds, and giving it room to spread, which is, that the Corn is not so liable to take the smut as when it is full of weeds, and the roots too much crowded, as I have frequently observed; so that cleanness and free air, is as essential to the well doing and growth of vegetables as animals; and the changing of the seed annually is also as necessary, as the change of air is to all sorts of animals; for where this has been carefully practised, there has rarely happened any smutty Corn in the field.

Brining of the seed Wheat is what the farmers generally practise to prevent the smut, which in most years answers very well; but there is nothing which contributes more to this, than keeping the plants in good health, which is better effected by the method before proposed; for by stirring of the ground with the hoe between the roots of Corn in the spring, they will be better supplied with nourishment; for in strong lands, where the water may have lain in the winter, the surface of the ground will bind so hard on the first dry weather as to stint the Corn, and frequently cause it to change colour. When this happens, the roots seldom put out many stalks, and those which are put out, are weak; but where the surface of the ground can be stirred to loosen the parts, the Corn will soon recover its colour and strength, and cover the land with shoots.

What has been here directed, must be understood to relate to Wheat sown in broad-cast, which is the usual method practised by farmers in every part of England; for the horse-hoeing husbandry which was practised by Mr. Tull, has been almost universally rejected by

by the farmers in every county, it being so opposite to their accustomed practice, that they cannot be prevailed upon to make trial of it; and indeed, by the absurdity of the author in a few particulars, he has discouraged many from engaging in it, who would have practised it; but upon finding Mr. Tull positively asserting, that the same land would nourish the same species of plants without changing the crops for ever, and this without manure, which being contrary to all experience, led them to believe his other principles had no better foundation. And he practised this method of sowing the same species upon the same ground, till his crops failed, and were much worse than those of his neighbours who continued their old method of husbandry, and hereby his horse-hoeing husbandry was ridiculed by them, and laid aside by gentlemen who were engaging in it. But notwithstanding these and some other particulars which have been advanced by Mr. Tull, yet it is much to be wished that this new husbandry might be universally practised; for some few persons who have made sufficient trial of it, have found their crops answer much better than in the common or old method of husbandry; and the French, who have learned it from Mr. Tull's book, are engaging in the practice of it with greater ardour than those of our own country: and although they had not the proper instruments of agriculture for the performance, and met with as strong opposition from the persons employed to execute the business as in England, yet the gentlemen seem determined to persist in the practice of it, though as yet few of their experiments have had the success they hoped for; partly from the awkwardness of their labourers, and partly from their averfeness to practise this husbandry, and also from their being made in land not well conditioned, but yet their produce has been equal to that of the old husbandry; and they say, that if the produce of the land in the new method of husbandry does not exceed that in the old way, yet by saving seven parts from eight of the seed Corn, it is a great affair to a whole country, especially in times of scarcity.

As Mr. Tull has given a full directions for the practice of this husbandry, I shall refer the reader to his book for instruction, and shall only mention two or three late experiments which have been made in his method, whereby the utility of it will more fully appear.

The first was in a field of Wheat, which was sown partly in broad-cast in the common method, and partly according to Tull's method; the spots thus sown were not regular in lands, but interspersed indifferently in many directions. Those parts of the field in Tull's method, were in rows at two feet distance, and stood thin in the rows. The roots of the Wheat in these spots had from ten to thirty stalks on a root, and continued upright till it was reaped; whereas few of the roots in the common method had more than two or three stalks, and these were most of them lodged before harvest; so that upon trial of the grain when threshed, there was near a third part more in weight and measure, than from the same extent of ground, taken in the best part of the field sown in the common way.

Another trial was made in sowing of the Corn in rows at different distances, with some sown in two parts of the ground broad-cast. The event was, that all which was sown broad-cast in the usual way was lodged, as was also most of that where the rows were six or nine inches asunder; those which stood a foot distance escaped better, but the rows two feet asunder were the best, and the produce much greater than any of the other; which plainly shews the absurdity of that practice, in sowing a great quantity of seeds to have a better produce, which is the opinion of most of the old farmers; and it was formerly the prevailing opinion among gardeners, who allowed near eight times the quantity of seeds for the same space of ground as is now usually sown, and these crops are greatly superior to any of those.

The produce of an acre of Wheat is various, according to the goodness of the soil. In some of the shallow, chalky, down lands, where there have been near four bushels of Corn sown, I have known the produce not more than double of the seed; but when this is the case, the farmer had much better let his land lie waste, since the produce will not defray the expence, so that more than the rent of the land is lost: and although these sorts of crops are frequently seen on such land, yet such is the passion for ploughing among the husbandmen at present, that if they were not restrained by their landlords, they would introduce the plough into every field, notwithstanding they are sure to lose by it.

But although the produce of these poor downs is so small, as before related, yet upon good land, where the Corn has stood thin upon the ground, I have known eight or ten quarters reaped from an acre, over the whole field, and sometimes much more. And I have been informed by persons of great credit, that on good land, which was drilled and managed with the horse-hoe, they have had twelve quarters from an acre of land, which is a great produce; and this is with greater certainty, if the seasons prove bad, than can be expected by the common husbandry.

The finest field of Wheat I ever yet saw, was sown in rows at a foot and a half distance; the allowance of seed to this field was three gallons, and by the common practice of the farmers, there is seldom less than three bushels, which is eight times the quantity: this Wheat was hoed by the hand twice in the spring, which cost five shillings and six-pence per acre. When the Corn was in ear, it was not less than six feet high; there were from twelve to twenty stalks on each root, which were so strong as to all stand upright; the ears were very long, the ground perfectly clean from weeds, and the produce was more than eleven quarters to an acre of land. These experiments, one should imagine, would excite an industry among farmers to the practice; but on the contrary, not one of those in the neighbourhood would follow it.

The price of Corn varies continually, and this variation is often very great in the space of one or two years; so that from being so cheap, as that the farmers could not pay their rents, in the compass of a year or two the price has been doubled; for one or two plentiful harvests have lowered the price of Wheat so much, as to make it difficulty for the needy farmer to go on with his business who wants ready money for his crops, as soon as he can prepare them for the market. This has established a set of people called dealers in Corn, who have taken the advantage of the farmer's necessity, and engrossed their Corn to keep it for better markets; and these dealers have of late years increased so greatly in their numbers, to the great prejudice of the raisers and consumers of Corn, as may in time prove fatal to the country, by monopolizing the greatest part of the produce, and then set their own price upon it; so that between these Corn-factors as they are called, and the distillers, the price of bread may be too great for the labouring poor; which is an affair which requires more public attention than has yet been given to it.

The French are building public granaries for the conservation of their Corn, in most of their provinces; for as in some years they have great plenty of Corn, and at other time as great scarcity, they are contriving to prevent any great want of it.

When the Wheat is sold much under four shillings the bushel, the farmer cannot pay his rent and live; nor can the poorer sort of people afford to purchase good bread, when the Wheat is sold at a price much higher than six shillings the bushel; therefore when it is at a medium between these, there can be no great cause of complaint on either side.

TRIUMFETTA. Plum. Nov. Gen. 40. tab. 8. Lin. Gen. Plant. 529.

The CHARACTERS are,
The flower has no empalement; it has five linear, erect, obtuse petals, which are concave, and turn inward; it has

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has fifteen or sixteen rising stamina which are awl-shaped, erect, and the length of the petals, terminated by single summits; and a roundish germen supporting a style the length of the stamina, crowned by an acute bifid stigma. The germen afterward becomes a globular capsule, set with long prickles on every side, having four cells, each containing one seed, which is convex on one side and angular on the other.

This genus of plants is ranged in the first section of Linnæus's eleventh class, which contains those plants whose flowers have from eleven to nineteen stamina inclusive, and one style.

There is but one SPECIES of this genus at present known, viz.

TRIUMFETTA (*Lappula*.) Hort. Cliff. 210. *Triumfetta* fructu echinato racemoso. Gen. Plant. 40. *Triumfetta* with prickly branching fruit.

The title of this genus was given to it by Father Plumier, in honour of John Baptist Triumfetti, doctor of physic and philosophy at Bononia, who has published some curious tracts in botany.

This plant grows naturally in Jamaica, and most of the other islands of the West-Indies; it rises with an upright stem to the height of six or seven feet, which becomes ligneous toward the bottom, and divides upward into four or five branches, which are garnished with leaves placed alternately their whole length; these are about two inches and a half long, and almost two inches broad toward their base, divided almost into three lobes toward the top, and the middle division ending in an acute point; they are veined on their under side, are covered with a soft brown down, and have several veins running from the midrib to the sides; their upper side is of a yellowish green, and a little hairy; their borders are acutely, but unequally fawed, and stand upon foot-stalks an inch long. The branches are terminated by long spikes of flowers, which come out in clusters from the side of the principal foot-stalk, at distances of about an inch. The flowers are small, the petals narrow, and of a yellow colour; these are succeeded by burry capsules, something like those of the Agrimony, but are round; the prickles are longer than those, and are placed on every side. This plant generally flowers here in July and August, and in warm seasons the seeds do sometimes ripen in England.

It is propagated by seeds, which must be sown on a hot-bed early in the spring; and when the plants are come up, they should be each transplanted into a separate pot filled with light, fresh, kitchen-garden earth, and plunged into a moderate hot-bed of tanners bark; they must be shaded from the sun until they have taken new root, after which time they must be treated in the same manner as hath been directed for other tender exotic plants. During the summer season the plants may remain in this hot-bed, but in autumn they must be removed into the stove, and plunged into the bark-bed, observing to refresh them with water frequently; but in very cold weather it must not be given them in too great plenty. If the plants live through the winter, they will flower the following summer, so will ripen their seeds in autumn; but they may be continued two or three years, provided they are carefully managed.

TROLLIUS. Lin. Gen. Plant. 620. *Helleborus*. Tourn. Inst. R. H. 272. *Globe Ranunculus*, or *Locker Gowls*.

The CHARACTERS are,

The flower has no empalement; it has about fourteen almost oval petals, whose points meet together; it has nine nectariums, which are narrow, plain, incurved, and umbilicated, which are perforated at their base, and a great number of bristly stamina, terminated by erect summits, with numerous germina sitting close like a column, having no styles, but are crowned by pointed stigmas. The germen afterward become so many capsules collected into an oval head, each containing one seed.

This genus of plants is ranged in the seventh section of Linnæus's thirteenth class, which includes those

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plants whose flowers have many male and female parts.

The SPECIES are,

1. **TROLLIUS** (*Europæus*) corollis conniventibus, nectariis longitudine staminum. Lin. Sp. Plant. 556. *Trollius* with the petals of the flower meeting, and nectariums the length of the stamina. *Helleborus niger*, *ranunculi folio*, flore globoso majore. Tourn. Inst. R. H. 272. *Black Hellebore* with a *Crow-foot-leaf*, and a large globular flower, commonly called *Globe-flower*, or *Locker Gowls*.
2. **TROLLIUS** (*Asiaticus*) corollis patentibus, nectariis longitudine petalorum. Lin. Sp. Plant. 557. *Trollius* with an open spreading flower, and nectariums the length of the petals. *Helleborus aconiti folio*, flore globoso croceo. Amman. Ruth. 101. *Hellebore* with a *Wolf's-bane leaf*, and a globular *Saffron-coloured* flower.

The first sort grows naturally in the northern counties in England, and in many parts of Wales. I found it in great plenty growing in the park of Burrow-hall, in Lancashire; it has a perennial, fibrous, black root, from which spring up many leaves which resemble those of *Wolf's-bane*, cut into five segments almost to the bottom; the stalk rises near two feet high; it is smooth, hollow, and branches toward the top; each branch is terminated by one large yellow flower, shaped like those of *Crow-foot*, which has no empalement. These are composed of several concave petals, whose points turn inward toward each other, covering the parts of generation, so are of a globular form, whence it had the title of *Globe Ranunculus*. It flowers the latter end of May and the beginning of June, and the seeds ripen in August. This plant is frequently kept in gardens about London, and is easily propagated by parting of the roots; the best time for doing this is the latter end of September, when the leaves are beginning to decay. The roots should not be divided into small parts, if they are expected to flower strong the following year; these should be planted at a foot distance from each other, and require a shady situation and a moist soil. The roots need not be removed or parted oftener than once in three years, unless there is a desire of increasing them.

The second sort grows naturally in Siberia, from whence it was brought to the Imperial Garden at Peterburgh, and has been communicated since to several parts of Europe; this differs from the first in having larger leaves, which are of a lighter green colour; their segments are fewer and larger, resembling those of the yellow *Monk's-hood*. The petals of the flower spread open, and do not converge at their points like those of the first sort. The flowers, stamina, and nectariums are of an elegant *Saffron* colour. It flowers in May.

This sort may be propagated and treated in the same way as the first, but it requires a moister soil, and should have a shady situation, but not under the drip of trees; it thrives best on a north border, where the soil is loamy, but not too stiff. In such situations the plants will produce seeds in England, for if they are in a dry soil, or much exposed to the sun, they frequently die in summer. I have seen this sort in the most flourishing state, where the surface of the ground was covered with Moss to keep it moist.

As the flowers of both these plants make a pretty appearance during their continuance, they deserve a place in every good garden for the sake of variety, especially as they will thrive in moist shady places where few better plants will live; and by thus suiting the plants to the different soils and situations of a garden, every part may be furnished with beauties, and a greater variety may be preserved.

TROPÆOLUM. Lin. Gen. Plant. 421. *Cardaminum*. Tourn. Inst. R. H. 430. tab. 244. *Indian Cress*.

The CHARACTERS are,

The empalement of the flower is of one leaf, ending in five points; it is erect, spreading, coloured, and falls off.

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The two under segments are narrow; their tail ends in a nectarious horn, which is longer than the empalement. The flower has five roundish petals inserted in the segments of the empalement; the two upper sit close to the foot-stalk, but the lower have oblong hairy tails. It has eight short awl-shaped stamina, which decline and are unequal; terminated by oblong rising summits having four cells, and a roundish germen, with three lobes which are streaked, supporting a single erect style, crowned by an acute trifid stigma. The germen afterward becomes a solid fruit dividing in three parts, convex on the outside, angular within, having many furrows, each part or cell including one furrowed seed, convex on one side, and angular on the other.

This genus of plants is ranged in the first section of Linnæus's eighth class, which includes those plants whose flowers have eight stamina and one style.

The SPECIES are,

1. *TROPÆOLUM (Minus)* foliis subquinelobis, petalis obtusis. Hort. Upsal. 93. *Tropæolum* with leaves which are almost divided into five lobes, and obtuse petals to the flower. Cardaminum minus & vulgare. Tourn. Inst. R. H. 433. The common or smaller Indian Nasturtium.
2. *TROPÆOLUM (Majus)* foliis subquinelobis petalis obtusis. Hort. Upsal. 93. *Tropæolum* with five lobes to the leaves, and obtuse petals to the flower. Cardaminum ampliore folio & majore flore. Tourn. Inst. R. H. 430. Indian Nasturtium with a larger leaf and flower, commonly called Indian Cress.

The first sort grows naturally in Peru; this was first brought to Europe in 1684, and was raised in the gardens of Count Beverning in Holland.

It has a trailing herbaceous stalk, garnished with leaves almost circular. The foot-stalk is inserted in the center of the leaf, like a buckler, as is the Navelwort; the leaves are smooth, and of a grayish colour; the flowers come out from the wings of the stalks, standing upon very long slender foot-stalks; they are of an admirable structure, and are composed of five acute-pointed petals; the two upper are large and rounded, the three under are narrow, and their tails join together, and are lengthened into a tail two inches long. After the flower is passed, the germen turns to a roundish fruit which is furrowed, and divided into three lobes, each including one streaked seed. It flowers from Midsummer till the frost stops it in autumn.

There are two varieties of this, one with a deep Orange-coloured flower inclining to red, and the other with a pale yellow flower.

The second sort grows naturally about Lima; this has larger stalks than the former. The leaves are also larger, and their borders are indented almost into lobes; the flowers are larger, and their petals are rounded at their points. There are two colours of this sort as in the former, and one with double flowers, which is propagated by cuttings, for it does not produce seeds.

The first sort is less common at present in the English gardens than the second, the flowers of the latter being larger make a finer appearance, for which it is preferred; they are both esteemed annual plants, tho' they may be continued through the winter if they are kept in pots, and sheltered in a good green-house, in like manner as that with double flowers is preserved, and they may be propagated by cuttings as that is; but, as these ripen their seeds constantly every year, the plants are generally raised from seeds, which may be sown in April in the places where they are to remain, which should be where their stalks may have support, for they will climb six or eight feet high when they are trained up, and then their flowers will make a good appearance; but when they trail upon the ground, they will spread over the neighbouring plants and become unsightly.

The flowers of these plants are frequently eaten in salads; they have a warm taste like the Garden Cress, and are esteemed very wholesome; they are likewise used for garnishing dishes. The seeds are pickled, and by some are preferred to most kinds of pickles for sauce.

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TUBEROSE. See POLYANTHES.

TUBEROSE ROOTS are such as consist of an uniform fleshy substance, and are of a roundish figure, as Turneps, &c.

TUBULOUS PLANTS are such whose stems or flowers are hollow like a pipe.

TULIPA. Tourn. Inst. R. H. 373. tab. 199, 200. Lin. Gen. Plant. 376. Tulip.

The CHARACTERS are,

The flower has no empalement; it is of the bell-shape, and composed of six oblong, oval, concave, erect petals; it has six awl-shaped stamina which are shorter than the petals, terminated by oblong four-cornered summits; and a large, oblong, taper, three-cornered germen, having no style, crowned by a triangular, three-lobed, permanent stigma. The germen afterward turns to a three-cornered capsule having three cells, which are filled with compressed seeds, lying over each other in a double order.

This genus is ranged in the first section of Linnæus's sixth class, which contains those plants whose flowers have six stamina and one style.

The SPECIES are,

1. *TULIPA (Sylvestris)* flore subnutante, foliis lanceolatis. Lin. Sp. Plant. 305. Tulip with a nodding flower, and spear-shaped leaves. Tulipa minor lutea Italica. C. B. P. 63. The smaller yellow Italian Tulip.
2. *TULIPA (Gejneriana)* flore erecto, foliis ovato-lanceolatis. Lin. Sp. Plant. 306. Tulip with an erect flower, and oval spear-shaped leaves. Common Tulip with all its varieties.

The first sort was formerly preserved in the English gardens, but since there has been so many varieties of the second sort propagated in England, the first has been rejected, and is now only to be found in old neglected gardens. The petals of this flower end in acute points; the flower is yellow, and nods on one side, and the leaves are narrower than those of the common sort.

The common Tulip is so well known as to need no description, and it would be to little purpose to enumerate the several varieties of these flowers, which may be seen in one good garden, since there is no end of their numbers, and what some people may value at a considerable rate, others reject; and as there are annually a great variety of new flowers obtained from breeders, those which are old, if they have not very good properties to recommend them, are thrown out and despised, I shall therefore point out the properties of a good Tulip, according to the characteristics of the best florists of the present age. 1. It should have a tall strong stem. 2. The flower should consist of six leaves, three within, and three without; the former ought to be larger than the latter. 3. Their bottom should be proportioned to their top, and their upper part should be rounded off, and not terminate in a point. 4. These leaves, when opened, should neither turn inward nor bend outward, but rather stand erect, and the flower should be of a middling size, neither over large, nor too small. 5. The stripes should be small and regular, arising from the bottom of the flower; for if there are any remains of the former self-coloured bottom, the flower is in danger of losing its stripes again. The chives should not be yellow, but of a brown colour. When a flower has all these properties, it is esteemed a good one.

Tulips are generally divided into three classes, according to their seasons of flowering; as Præcoces, or early blowers; Medias, or middling blowers; and Serotines, or late blowers; but there is no occasion for making any more distinctions than two, viz. early and late blowers.

The early blowing Tulips are not near so fair, nor do they rise half so high as the late ones, but are chiefly valued for appearing so early in the spring, some of which will flower the middle of March in mild seasons, if planted in a warm border near a wall, pale, hedge, or other shelter, and the others will succeed them; so that they keep flowering until the general season for these flowers is come, which is toward the end of April. As these early blowing Tulips are but few,

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few, I shall insert the name of the principal of them, which are as follow :

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| 1. Duke Van Toll, or Winter Duke. | 21. Vice-roy. |
| 2. General Duke. | 22. Maria. |
| 3. General Brancion. | 23. Aurora Van Bart. |
| 4. Pretty Betty. | 24. Paragon Grebberi. |
| 5. Duchefs of Brancion. | 25. Galatea. |
| 6. Lac Verine. | 26. Marquis. |
| 7. Violet Ragans. | 27. Gilden Bloemen. |
| 8. Violet Remow, or Pourpre Lifé. | 28. Alcetus. |
| 9. Palto Van Leyden. | 29. Jewel Van Haerlem. |
| 10. Florifante. | 30. Jacht Van Delft. |
| 11. Brandenburgh. | 31. Goude Son. |
| 12. Nonfuch. | 32. Flamboyant. |
| 13. Admiral Crinki. | 33. Bruyd Renard. |
| 14. General Molfwick. | 34. Palamedes. |
| 15. Paragon Cleremont. | 35. Apollo. |
| 16. Admiral Encufen. | 36. Juno. |
| 17. Morillion. | 37. Silver-boot. |
| 18. Nobleft. | 38. Florida Voorhelm. |
| 19. Early Perfect. | 39. Roy d'Efpagne. |
| 20. Superintendent. | 40. Metropolit. |
| | 41. Konins-kroon. |

These are the names which have been imposed on these flowers by the florists of the several countries where they were raised, and by which the roots may be obtained from Flanders and Holland, where the florists are very exact in keeping up their lists of these flowers complete.

The roots of these early blowing Tulips should be planted the beginning of September in a warm border, near a wall, pale, or hedge ; because if they are put into an open spot of ground, their buds are in danger of suffering by morning frosts in the spring. The soil for these should be renewed every year, where people intend to have them fair. The best soil for this purpose is that which is taken from a light sandy pasture, with the turf rotted amongst it, and to this should be added a fourth part of sea sand. This mixture may be laid about ten inches deep, which will be sufficient for these roots, which need not be planted more than four or five inches deep at most. The offsets should not be planted amongst the blowing roots, but in a border by themselves, where they may be planted pretty close together, especially if they are small ; but these should be taken up when their leaves decay, in the same manner as the blowing roots, otherwise they would rot if the season should prove very wet ; for these are not so hardy as the late blowers, nor do they increase half so fast as those, so that a greater care is required to preserve the offsets of them. When these Tulips come up in the spring, the earth upon the surface of the borders should be gently stirred and cleared from weeds ; and as the buds appear, if the season should prove very severe, it will be of great service to cover them with mats, for want of which many times they are blighted, and their flowers decay before they blow, which is often injurious to the roots, as is also the cropping of the flowers so soon as they are blown ; because their roots, which are formed new every year, are not at that time arrived to their full magnitude, and are hereby deprived of proper nourishment.

If, when these flowers are blown, the season should prove very warm, it will be proper to shade them with mats, &c. in the heat of the day ; as also if the nights are frosty, they should be in like manner covered, whereby they may be preserved a long time in beauty ; but, when their flowers are decayed, and their seed-vessels begin to swell, they should be broken off just at the top of the stalks, because if they are permitted to feed, it will injure the roots.

When the leaves of these flowers are decayed (which will be before the late blowers are out of flower) their roots should be taken up, and spread upon mats in a shady place to dry ; after which they should be cleared from their filth, and put in a dry place where the vermin cannot come to them, until the season

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for planting them again, being very careful to preserve every sort separate, that you may know how to dispose of them at the time for planting them again ; because it is the better way to plant all the roots of each sort together (and not to intermix them, as is commonly practised in most other kinds of flowers ;) for as there are few of them which blow at the same time, so when the several roots of one sort are scattered through a whole border, they make but an indifferent appearance ; whereas, when twenty or thirty roots of the same sort are placed together, they will all flower at the same time, and afford a more agreeable prospect.

There are many curious persons, who, in order to preserve their several kinds of Tulips, and other bulbous-rooted flowers separate, have large flat boxes made, which are divided into several parts by small partitions, each of which is numbered in the same manner as the divisions of their beds ; so that when a catalogue of their roots is made, and the numbers fixed to each sort in the beds, there is nothing more to do when they take up their roots, but to put every kind into the division marked with the same number which was placed to each sort in the bed, which saves a great deal of trouble in making fresh marks every time the roots are taken up, and effectually answers the purpose of preserving the kinds separate.

The several sorts of these early blowing Tulips rise to different heights in their stems, so that scarcely any two of them grow to an equal height. The Duke Van Toll being one of the first that appears in the spring, is generally very short-stalked, and so the other sorts, in proportion to their earliness, are shorter than those which succeed them, and the late blowing kinds are all of them considerably longer in their stems than any of the *Præcoces*, or early blowers ; so that when they are confusedly mixed together, they make a very indifferent appearance.

The late blowing Tulips are so numerous, that, as I before observed, it would be to no purpose to attempt to give a catalogue of them. These are generally obtained from breeders, which is a term applied to all such flowers as are produced from seeds, which are of one self-colour, and have good bottoms and chives ; these in time break into various beautiful stripes, according to the ground of their former self-colour, but this must be entirely thrown off, otherwise they do not esteem a flower well broken.

Of these breeders there hath been a great variety brought into England from Flanders of late years, which is the grand nursery for most sorts of bulbous-rooted flowers ; but there are some curious persons, who have lately obtained many valuable breeders from seed sown in England ; and doubtless, were we as industrious to sow the seeds of these flowers as the people of France and Flanders, we might in a few years have as great a variety as is to be found in any part of Europe ; for, although it is six or seven years from the sowing before the flowers blow, yet, if after the first sowing there is every year a fresh parcel sown, when the seven years are expired, there will be constantly a succession of roots to flower every year, which will reward the expectation, and keep up the spirit of raising ; but it is the length of time at first, which deters most people from this work.

The manner of propagating these flowers from seeds is as follows : you should be careful in the choice of the seed, without which there can be little success expected. The best seed is that which is saved from breeders which have all the good properties before related, for the seeds of striped flowers seldom produce any thing that is valuable.

The best method to obtain good seeds is to make choice of a parcel of such breeding Tulip roots as you would save seeds from, and place them in a separate bed from the breeders, in a part of the garden where they may be fully exposed to the sun, observing to plant them at least nine inches deep ; for if they are planted too shallow, their stems are apt to decay before their seed is perfected.

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These flowers should always be exposed to the weather, for if they are shaded with mats, or any other covering, it will prevent their perfecting the seed. About the middle of July, (a little sooner or later, as the summer is hotter or colder) the seeds will be fit to gather, which may be known by the dryness of their stalks, and the opening of the seed-vessels, at which time it may be cut off, and preserved in the pods till the season for sowing it, being careful to put it up in a dry place, otherwise it will be subject to mould, which will render it good for little.

Having saved a parcel of good seed, about the beginning of September is the best season for sowing it, when there should be provided a parcel of shallow seed-pans, or boxes, which should have holes in their bottoms to let the moisture pass off; these must be filled with fresh sandy earth, laying the surface very even, upon which the seeds should be sown as regularly as possible, that they may not lie upon each other; then there should be some of the same light sandy earth sifted over them, about half an inch thick. These boxes or pans should be placed where they may have the morning sun till eleven of the clock, in which situation they may remain until October, at which time they should be removed into a more open situation, where they may enjoy the benefit of the sun all the day, and be sheltered from the north winds, where they should remain during the winter season; but in the spring, when the plants are up, they should be again removed to their first situation; and if the season should be dry, they must be refreshed with water while the plants remain green; but as soon as their tops begin to decay, there must be no more given them, lest it rot their tender bulbs; therefore the boxes should be placed in a shady situation during the summer season, but not under the drip of trees.

These plants, at their first appearance, have very narrow grassy leaves like those of Onions, and come up with bending heads, in the same manner as they do; so that persons who are unacquainted with them, may pull them up instead of Grass whilst they are very young, before their leaves are a little more expanded, which is rarely performed the first year; for they seldom appear before the middle of March, and they commonly decay about the latter end of May, or the beginning of June, according as the season is hotter or colder.

The weeds and Moss should also be cleared off from the surface of the earth in the boxes, and a little fresh earth sifted over them soon after their leaves decay, which will be of great service to their roots. These boxes should be constantly kept clear from weeds, which, if permitted to grow therein, when they are pulled up, the roots will be apt to draw the bulbs out of the ground. At Michaelmas they should be fresh earthed again, and as the winter comes on, they must be again removed into the sun as before, and treated in the same manner, until the leaves decay in the spring, when the bulbs should be carefully taken up, and planted in beds of fresh sandy earth, which should have tiles laid under them, to prevent their roots from shooting downward, which they often do when there is nothing to stop them, and thereby are destroyed. The earth of these beds should be about five inches thick upon the tiles, which will be sufficient for nourishing these roots while they are young.

The distance which these young bulbs should be allowed, need not be more than two inches, nor should they be planted above two inches deep; but toward the end of October, it will be proper to cover the beds over with a little fresh earth about an inch deep, which will preserve the roots from the frost, and prevent Moss or weeds from growing over them; but, if the winter should be very severe, it will be proper to cover the bed either with mats or Peas-haulm, to prevent the frost from entering the ground, because these roots are much tenderer while young, than they are after they have acquired strength.

In the spring the surface of the ground should be gently stirred to make it clean, before the plants come

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up; and if the spring should prove dry, they must be frequently refreshed with water during the time of their growth; but this must not be given to them in great quantities, lest it rot their tender bulbs; and when the leaves are decayed, the weeds should be taken off, and the beds covered with fresh earth, which should also be repeated again in autumn.

In these beds the bulbs may remain two years, during which time they must be constantly kept clear from weeds, and in spring and autumn fresh earthed, in the manner already directed; after which the bulbs must be taken up, and planted into fresh beds, at four inches asunder, and as many deep, where they may remain two years more, during which time they should have the same culture as before; and after that, the bulbs being large enough to blow, they should be taken up, and planted in fresh beds at the usual distance, and in the same manner as old roots; where, when they flower, such of them as are worthy to be preserved, should be marked with sticks; and at the season for taking up the bulbs, they must be separated from the others, in order to be planted as breeders in different beds; but you should by no means throw out the rest until they have flowered two or three years, because it is impossible to judge exactly of their value in less time; for many, which at first flowering appear beautiful, will afterwards degenerate so as to be of little value; and others, which did not please at first, will many times improve, so that they should be preserved until their worth can be well judged of.

In this method many sorts of new breeders will be annually raised, from which there will always be fine flowers broken, which, being the produce of a person's own sowing, will be greatly valued, because they are not in other hands, which is what enhances the price of all flowers: and it has been entirely owing to this method of raising new flowers, that the Dutch have been so famous, amongst whom the passion for fine Tulips did some time reign so violently, that many of the florists near Haerlem have often given a hundred ducats for one single root; which extravagance was the occasion of an order being made by the States, to limit the utmost price that should be afterward given for any Tulip root, were it ever so fine.

Having thus given an account of the method of raising these flowers from seeds, I shall now proceed to the management of those roots which are termed breeders, so as to have some of them every year break out into fine stripes.

There are some who pretend to have a secret how to make any sort of breeders break into stripes whenever they please, but this, I dare say, is without foundation; for from many experiments which I and others have made of this kind, I never could find any certainty of this matter. All that can be done by art, is to shift the roots every year into fresh earth of different mixtures and a different situation, by which method I have had very good success.

The earth of these beds should be every year different, for although it is generally agreed that lean, hungry, fresh earth doth hasten their breaking, and cause their stripes to be the finer and more beautiful, yet, if they are every year planted in the same sort of soil, it will not have so much effect on them, as if they were one year planted in one sort of earth, and the next year in a very indifferent one, as I have several times experienced; and if some fine striped Tulips are planted in the same beds with the breeders, intermixing them together, it will also cause the breeders to break the sooner.

The best compost for these roots is a third part of fresh earth from a good pasture, which should have the sward rotted with it, a third part of sea sand, and the other part sifted lime rubbish; these should be all mixed together six or eight months at least before it is used, and should be frequently turned, in order to mix the parts well together. With this mixture the beds should be made about two feet deep, after the following manner: after the old earth is taken from out of the bed to the depth intended, then some of the fresh earth

earth should be put in about eighteen inches thick ; this should be levelled exactly, and then lines drawn each way of the bed, chequerwise ; at six inches distance, upon the center of each cross, should be placed the Tulip roots, in an upright position, and after having finished the bed in this manner, the earth must be filled in, so as to raise the bed six or eight inches higher, observing, in doing this, not to displace any of the roots, and also to lay the top of the beds a little rounding to throw off the water.

There are many persons who are so careless in planting their Tulip roots, as only to dig and level the beds well, and then with a blunt dibble to make holes, into which they put the roots, and then fill up the holes with a rake, but this is by no means a good method ; for the dibble, in making the holes, presses the earth closely on each side, and at the bottom, whereby the moisture is often detained so long about the roots as to rot them, especially if the soil is inclinable to bind ; besides the earth being hard at the bottom of the bulbs, they cannot so easily emit their fibres, which must certainly prejudice the roots.

These beds should be sunk, more or less, below the surface, according to the moisture or dryness of the ground, for the roots should be so elevated as never to have the water stand near the reach of their fibres in winter, for moisture is very apt to rot them ; so that where the soil is very wet, it will be proper to lay some lime rubbish under the earth, in order to drain off the wet, and the beds should be entirely raised above the level of the ground ; but to prevent their falling down into the walks, after frost or hard rains, it will be proper to raise the paths between them, either with sea coal ashes or rubbish, eight or ten inches, which will support the earth of the beds ; and these paths may slope at each end from the middle, which will make passage for the water to run off as it falls. But where the soil is dry, the bottom of the beds may be sunk eighteen or twenty inches below the surface, for in such places the beds need not be more than four or six inches above the surface, which will be allowance enough for their settling.

During the winter season there will be no farther care required. The roots being planted thus deep, will be in no danger of suffering by ordinary frosts, but if the winter should prove very severe, some rotten tan or Peas-haulm may be laid over the beds to keep out the frost during the continuance, but this must be removed when the frost is over ; and in the spring, when their leaves begin to appear above ground, the earth upon the surface of the beds should be stirred to clear it from weeds, Moss, &c. and when the flower-buds begin to come up, they should be guarded from frost, otherwise they are very subject to blight and decay soon after they appear, if the frost pinches their tops ; but they need only be covered in such nights when there is a prospect of frost, for at all other times they should have as much air as possible, without which they will draw up weak, and produce small flowers.

When the breeding Tulips are in flower, you should carefully examine them, to see if any of them have broken into beautiful stripes, which, if you observe, there should be a stick put into the ground by every such root, to mark them, that they may be separated from the breeders, to plant amongst the striped flowers the following year ; but you should carefully observe, whether they have thrown off their former colour entirely, as also when they decay, to see if they continue beautiful to the last, and not appeared smeared over with the original colour, in both which cases they are very subject to go back to their old colour the next year : but if their stripes are distinct and clear to the bottom, and continue so to the last, (which is what the florists call dyeing well,) there is no great danger of their returning back again, as hath been by some confidently reported ; for if one of these flowers is quite broken (as it is termed,) it will never lose its stripes, though sometimes they will blow much fairer than at others, and the flowers of the

offsets will be often more beautiful than those of the old roots.

This alteration in the colour of these flowers may be seen long before they are blown, for all the green leaves of the plant will appear of a fainter colour, and seem to be striped with white, or of a brownish colour, which is a plain proof, that the juices of the whole plant are altered, or, at least, the vessels thro' which the juice is strained ; so that hereby particles of a different figure are capable of passing through them, which, when entered into the petals of the flower, reflect the rays of light in a different manner, which occasions the variety we see in the colours of flowers (but this is more fully explained in the article VEGETATION, which see.) This breaking of the colours in flowers proceeds from weakness, or at least is the cause of weakness in plants ; for it is observable, that after Tulips are broken into fine stripes, they never grow so tall as before, nor are the stems, leaves, or flowers, so large as before ; and it is the same in all other variegated plants and flowers whatever, which are also much tenderer than they were before they were striped ; so that many sorts of exotic plants which by accident became variegated in their leaves, are often rendered so tender, as not to be preserved without much more care, though indeed the striping of Tulips doth never occasion so great weakness in them as to render them very tender. The greatest effect it hath on them, is in lessening their growth, causing some (which, while they continued in their original plain colours, did rise near three feet in height) to advance little more than two after their colours were altered ; and the more beautifully their stripes appear, the shorter will be their stems, and the weaker their flowers.

There is nothing more to be observed in the culture of striped flowers than what has been directed for breeders, excepting that these should be arched over with tall hoops and rails, that they may be shaded from the sun in the day time, and protected from strong winds, hard rains, and frosty mornings, otherwise the flowers will continue but a short time in beauty ; but where the instructions here given are duly followed, they may be preserved in flower a full month, which is as long as most other flowers continue.

There are some persons who are so extremely fond of these flowers, as to be at a great expence in erecting large frames of iron work to cover their beds of Tulips, in such a manner, that they may walk between two beds under the frames, over which are spread tarpaulins, so as to keep off sun, rain, and frost, whereby they can view the flowers without being at the trouble of taking off or turning up the tarpaulins, or being incommoded by the sun or rain, which cannot be avoided where the covering is low ; besides, by thus raising the covers, the flowers have a greater share of air, so that they are not drawn so weak, as they are when the covering is low and close to them ; but these frames being expensive, can only be made by persons of fortune ; however, there may be some of wood contrived at a smaller expence, which being arched over with hoops, may answer the purpose as well as the iron frames, though they are not so lightly or lasting.

But after the flowers are faded, the heads of all the fine sorts should be broken off to prevent their seeding ; for if this is not observed, they will not flower near so well the following year, nor will their stripes continue so perfect ; and this will also cause their stems to decay sooner than otherwise they would do, so that their roots may be taken up early in June, for they should not remain in the ground after their leaves are decayed. In taking the roots out of the ground, you must be very careful not to bruise or cut them, which will endanger their rotting, and, if possible, it should be done a day or two after rain. When these roots are taken out of the ground, they must be cleared from their old covers, and all sorts of filth, and spread upon mats in a shady place to dry, after which they should be put up in a dry place, where vermin

cannot get to them, observing to keep every sort separate, but they should not be kept too close from the air, nor suffered to lie in heaps together, lest they should grow mouldy, for if any of the roots once take the mould, they commonly rot when they are planted again, if not before.

The offsets of these roots, which are not large enough to produce flowers the succeeding year, should be also put by themselves, keeping each sort distinct; these should be planted a month earlier in autumn than the blowing roots, in particular beds by themselves in the flower-nursery, where they may not be exposed to public view; but the earth of the beds should be prepared for them in the same manner as for larger roots, though these should not be planted above five inches deep, because they are not strong enough to push through so great covering of the earth as the old roots; they may be placed much nearer together than those which are to flower, and in one year most of them will become strong enough to flower, when they may be removed into the flower-garden, and placed in the beds amongst those of the same kinds.

TULIPIFERA. Herm. Hort. Leyd. Boerh. Ind. Plant. 11. p. 262. Liriodendrum. Lin. Gen. Plant. 609. [of Tulipa, a Tulip, and fero, Lat. to bear.] The Tulip-tree.

The CHARACTERS are,

The proper involucre of the flower is composed of two angular leaves, which fall off; the empalement is composed of three oblong plain leaves like petals, which fall away. The flower is nearly of the bell-shape, and has six petals, which are obtuse and channelled at their base; the three outer fall off; it has a great number of narrow stamina, which are inserted to the receptacle of the flower, having long narrow summits fastened to their side, and many germen disposed in a cone, having no style, crowned by a single globular stigma. The germen afterward become scaly seeds, lying over each other like the scales of fish, and form the resemblance of a cone.

This genus of plants is ranged in the seventh section of Linnæus's thirteenth class, which includes those plants whose flowers have many male and female parts. He has altered the title of it to Liriodendrum, but as the flowers of this tree have as little resemblance of a Lily, as they have of a Tulip, the first title may be as well continued, especially as it has been long known in Europe by the title Tulipifera.

We have but one SPECIES of this genus, viz.

TULIPIFERA (*Liriodendron*.) *The Tulip-tree.* Tulipifera arbor Virginiana. H. L. *The Virginia Tulip-tree; and by Linnæus* Liriodendron foliis lobatis. Lin. Sp. Plant. 755.

This is a native of North America, where it grows so large as to be a tree of the first magnitude, and is generally known thro' all the English settlements by the title of Poplar. Of late years there has been great numbers of these trees raised from seeds in the English gardens, so that now they are become common in the nurseries about London, and there are many of the trees in several parts of England which do annually produce flowers. The first tree of this kind which flowered here, was in the gardens of the late Earl of Peterborough, at Parsons Green near Fulham, which was planted in a wilderness among other trees; before this was planted in the open air, the few plants which were then in the English gardens, were planted in pots and housed in winter, supposing they were too tender to live in the open air; but this tree soon after it was placed in the full ground, convincing the gardeners of their mistake, by the great progress it made, while those which were kept in pots and tubs increased slowly in their growth; so that afterward there were many others planted in the full ground, which are now arrived to a large size, especially those which were planted in a moist soil. One of the handsomest trees of this kind near London, is in the garden of Waltham Abbey; and at Wilton, the seat of the Earl of Pembroke, there are some trees of great bulk; but the old tree at Parsons Green is quite destroyed, by the other trees which were suffered to over-hang it,

and rob it of its nourishment, from a fear of taking down the neighbouring trees, lest by admitting the cold air to the Tulip-tree it would injure it.

The young shoots of this tree are covered with a smooth purplish bark; they are garnished with large leaves, whose foot-stalks are four inches long; they are ranged alternate; the leaves are of a singular form, being divided into three lobes; the middle lobe is blunt and hollowed at the point, appearing as if it had been cut with scissars. The two side lobes are rounded, and end in blunt points. The leaves are from four to five inches broad near their base, and about four inches long from the foot-stalk to the point, having a strong midrib, which is formed by the prolongation of the foot-stalk. From the midrib run many transverse veins to the borders, which ramify into several smaller. The upper surface of the leaves is smooth, and of a lucid green, the under is of a pale green. The flowers are produced at the end of the branches; they are composed of six petals, three without, and three within, which form a sort of bell-shaped flower, from whence the inhabitants of North America gave it the title of Tulip. These petals are marked with green, yellow, and red spots, so make a fine appearance when the trees are well charged with flowers. The time of this tree's flowering is in July, and when the flowers drop, the germen swells and forms a kind of cone, but these do not ripen in England.

Mr. Catesby, in his Natural History of Carolina, &c. says, There are some of these trees in America, which are thirty feet in circumference; that the boughs are unequal and irregular, making several bends or elbows, which render the trees distinguishable at a great distance, even when they have no leaves upon them. They are found in most parts of the northern continent of America, from the Cape of Florida to New England, where the timber is of great use, particularly for making of periaugues, the trunks of these being large enough to be hollowed into the shape of those boats, so they are of one piece.

This tree is propagated by seeds, which are now annually imported in great plenty from America. These may be either sown in pots or tubs filled with light earth from the kitchen-garden, or in a bed in the full ground. Those which are sown in the first way, may be placed on a gentle hot-bed, which will forward their growth, so that the plants will acquire more strength before winter. If they are thus treated, the glasses of the hot-bed should be shaded from the sun every day, and the earth in the pots should be frequently refreshed with water, for unless it is kept moist, the seeds will not grow; but this must be done with care, so as not to make it too wet, which will rot the seeds. When the plants appear, they must be still shaded in the heat of the day from the sun, but fresh air must be admitted daily to prevent their drawing up weak, and as the season advances, they must be gradually hardened to bear the open air. While the plants are young, they do not care for much sun, so they should be either shaded or placed where the morning sun only shines upon them; they must also be constantly supplied with water, but not have it in too great plenty. As the young plants commonly continue growing late in the summer, so when there happens early frosts in autumn, it often kills their tender tops, which occasions their dying down a considerable length in winter; therefore they should be carefully guarded against these first frosts, which are always more hurtful to them than harder frosts afterward, when their shoots are better hardened; however, the first winter after the plants come up, it will be the better way to shelter them in a common hot-bed frame, or to arch them over with hoops, and cover them with mats, exposing them always to the open air in mild weather.

The following spring, just before the plants begin to shoot, they should be transplanted into nursery-beds, in a sheltered situation, where they are not too much exposed to the sun. The soil of these beds should be

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a soft gentle loam, not too stiff, nor over light; this should be well wrought, and the clods well broken, and made fine. There must be great care taken not to break the roots of the plants in taking them up, for they are very tender; they should be planted again as soon as possible, for if their roots are long out of the ground, they will be much injured thereby. These may be planted in rows at about a foot distance, and at six inches distance in the rows, for as they should not remain long in these nursery-beds, so this will be room enough for them to grow; and by having them so close, they may be shaded in the summer, or sheltered in the winter, with more ease than when they are farther apart.

When the plants are thus planted, if the surface of the beds is covered with rotten tanners bark, or with Moss, it will prevent the earth from drying too fast, so that the plants will not require to be so often watered, as they must be where the ground is exposed to the sun and air; after this, the farther care will be to keep them clean from weeds, and if the latter part of summer should prove moist, it will occasion the plants growing late in autumn, so the tops will be tender and liable to be killed by the first frosts. In this case, they should be covered with mats to protect them.

If the plants make great progress the first summer, they may be transplanted again the following spring; part of them may be planted in the places where they are to remain, and the other should be planted in a nursery where they may grow two or three years to acquire strength before they are planted out for good; though the younger they are planted in the places where they are to stand, the larger they will grow, for the roots run out into length, and when they are cut it greatly retards their growth, so that these trees should never be removed large, for they rarely succeed when they are grown to a large size before they are transplanted. Some trees I have seen removed pretty large, which have survived their removal, but young plants of two or three years old which were planted near them, were much larger in fifteen years than the old ones.

When the seeds are sown upon a bed in the full ground, the bed should be arched over with hoops, and shaded in the heat of the day from the sun, and frequently refreshed with water; as also should the plants when they appear, for when they are exposed much to the sun they make but small progress. The care of these in summer must be to keep them clean from weeds, supplying them duly with water, and shading them from the sun in hot weather; but as these seeds will not come up so soon as those which were placed on a hot-bed, they generally continue growing later in autumn, therefore will require shelter from the early frosts in autumn; for as the shoots of these will be much softer than those of the plants which had longer time to grow, so if the autumnal frosts should prove severe, they will be in danger of being killed down to the surface of the ground, by which the whole summer's growth will be lost, and sometimes the plants are entirely killed by the frost the first winter, if they are not protected.

As these plants will not have advanced so much in their growth as the other, they should remain in the seed-bed to have another year's growth before they are removed; therefore all that will be necessary to observe the second year is to keep them clean from weeds; and now they will not be in so much danger of suffering from the warmth of the sun as before, therefore will not require such constant care to shade them; nor should the watering of them be continued longer than the spring, for if the autumn should prove dry, it will prevent the plants from shooting late, and harden those shoots which were made early in the year, whereby the plants will be in less danger from the early frosts.

After the plants have grown two years in the seed-bed, they will be strong enough to remove, therefore, in the spring, just at the time when their buds begin to

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swell, they should be carefully taken up, and transplanted into nursery-beds, and treated in the same way as has been before directed for the plants which were raised on a hot-bed.

There are some people who propagate this tree by layers, but the layers are commonly two or three years before they take root, and the plants so raised, seldom make such straight trees as those raised from seeds; though indeed they will produce flowers sooner, as is always the case with stunted plants.

This tree should be planted on a light loamy soil, not too dry, on which it will thrive much better than upon a strong clay, or a dry gravelly ground; for in America they are chiefly found upon a moist light soil, where they will grow to a prodigious size, though it will not be proper to plant these trees in a soil which is too moist in England, because it might endanger the rotting of the fibres of the roots, by the moisture continuing too long about them, especially if the bottom be clay, or a strong loam, which will detain the wet.

TURKS CAP. See LILIUM.

TURKEY WHEAT. See ZEA.

TURNEP. See RAPA.

TURNERA. Plum. Nov. Gen. 15. tab. 12. Lin. Gen. Plant. 338.

The CHARACTERS are,

The empalement of the flower is funnel-shaped, of one leaf, having an oblong, cylindrical, angular tube, and is cut into five segments. The flower has five heart-shaped, pointed, plain petals, with narrow tails which are inserted in the tube of the empalement; it has five awl-shaped stamens which are shorter than the petals, inserted in the empalement, and are terminated by acute-pointed erect summits, and a conical germen supporting three slender styles, crowned by hairy many-pointed stigmas. The germen afterward turns to an oval capsule with one cell, which opens at the top with three valves, and contains several oblong obtuse seeds.

This genus of plants is ranged in the third section of Linnæus's fifth class, which includes those plants whose flowers have five male and three female parts.

The SPECIES are,

1. TURNERA (*Ulmifolia*) floribus sessilibus petiolaribus, foliis basi biglandulosis. Lin. Sp. Plant. 337. *Turnera with flowers growing close to the foot-stalks of the leaves, whose base has two glands. Turnera ulmifolia. Plum. Nov. Gen. 15. Shrubby Turnera with an Elm leaf.*
2. TURNERA (*Angustifolia*) floribus sessilibus petiolaribus foliis lanceolatis rugosis acuminatis. *Turnera with flowers sitting close to the foot-stalks of the leaves, and spear-shaped rough-pointed leaves. Cistus urticæ folio, flore luteo, vasculis trigonis. Sloan. Cat. Jam. 86. Cistus with a Nettle leaf, a yellow flower, and a three-cornered capsule.*

These plants are both of them natives of the warm parts of America. The first species was found by Father Plumier in Martinico, who gave it the name of Turnera, in honour of Dr. Turner, a famous English physician, who lived in Queen Elizabeth's reign, and wrote an herbal, in which he has chiefly described the useful plants.

The second sort was discovered by Sir Hans Sloane, who has figured it in his Natural History of Jamaica, under the following title, *Cistus urticæ folio, flore luteo, vasculis trigonis*, vol. i. p. 202; but both these sorts were observed by my late friend Dr. William Houstoun, in several parts of America.

This sort rises with a shrubby stalk to the height of eight or ten feet, sending out branches on every side the whole length; these are garnished with narrow spear-shaped leaves, which are hairy; they are near three inches long, and about three quarters of an inch broad, terminating in acute points; they are obtusely sawed on their edges, and stand upon very short foot-stalks; these, when rubbed, emit a disagreeable odour. The flowers grow from the foot-stalks of the leaves, to which they sit very close, having two pretty large leafy appendages to their empalements. The flowers are of a pale yellow colour, and are com-

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composed of five large oval petals, whose tails are twisted and join; these are succeeded by short tubular capsules having one cell, which opens at the top with three valves which turn back, and let out the seeds.

The first sort has a shrubby stalk like the second, and rises to the same height. The branches of this are slender, and stiffer than those of the former. The leaves are oval, spear-shaped, two inches and a half long, and an inch and a half broad, rough on their upper side, and of a lucid green; their under side has many strong veins, and is of a lighter green; they are sawed on their edges, and have longer foot-stalks than those of the second species, and stand much farther asunder on the branches. The flowers sit close upon the foot-stalks of the leaves, in like manner as the former, but the flowers are larger and of a brighter yellow than those of the former. These differences remain constant, and never alter when raised from seeds; so that from near thirty years experience in sowing the seeds, I may pronounce them different species.

These plants are easily propagated by sowing their seeds on a hot-bed early in the spring, and when the plants are come up two inches high, they should be transplanted into small pots, and plunged into a hot-bed of tanners bark, observing to water and shade them until they have taken root; after which they must be treated as hath been directed for the Guavas, and other tender plants from the same countries, to which the reader is desired to turn to avoid repetition. The seeds of these plants will often fall into the pots which are placed near them in the stove, which will grow, and soon furnish plants enough, after a person is once possessed of them. As they are too tender to live in the open air in England, they must be placed in the bark-bed in the stove, where, during the winter season, they must be kept warm and frequently watered; but in the summer season, they must have a great share of air, otherwise they will draw up tender, and not produce many flowers.

When the plants are grown pretty large, they may be treated more hardily, by placing them in the dry stove; where, if they are kept in a moderate degree of heat, they will thrive and flower very well. Those who would save the seeds of these plants, must watch them carefully, because, when they are ripe, they soon scatter if they are not gathered.

These plants produce their flowers great part of the year, if they are kept in a proper degree of warmth, so that there are some of the flowers in beauty for at least nine or ten months, which renders the plants more valuable.

TURNSOLE. See **HELIOTROPIUM**.

TURRITIS. Tourn. Inst. R. H. 223. Dillen. Gen. Nov. 6. Lin. Gen. Plant. 733. Tower Mustard.

The CHARACTERS are,

The empalement of the flower is composed of four oblong oval leaves, which are erect, and close together. The flower has four oblong, oval, entire petals, placed in form of a cross, and six erect awl-shaped stamina the length of the tube, two of which are shorter than the other, terminated by single summits, and a taper germen a little compressed, having no style, but is crowned by an obtuse stigma. The germen afterward becomes a long four-cornered pod with two cells, which are divided by an intermediate partition opening with two valves, and filled with small, roundish indented seed.

This genus of plants is ranged in the second section of Linnæus's fifteenth class, which contains the plants whose flowers have four long and two shorter stamina, and the seeds are included in long pods.

The SPECIES are,

1. **TURRITIS** (*Glabra*) foliis radicalibus dentatis hispidis, caulinis integerrimis amplexicaulibus glabris. Hort. Cliff. 339. *Tower Mustard with hispid lower leaves which are indented, and the upper ones smooth, entire, and embracing the stalk.* Turritis foliis inferioribus cichoraceis cæteris perfoliata. Tourn. Inst. 224. *Tower Mus-*

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tard with under leaves like Cicory, and the upper like Thorowwax.

2. **TURRITIS** (*Hirsuta*) foliis omnibus hispidis, caulinis amplexicaulibus. Hort. Cliff. 339. *Tower Mustard with all the leaves prickly, and the upper ones embracing the stalk.* Erysimo similis hirsuta, non laciniata alba. C. B. P. 101. *A hairy plant resembling Hedge Mustard, but the leaves not jagged.*

The first sort grows naturally in several parts of England, upon walls and dry banks; this hath its lower leaves much jagged on their edges, and are rough to the touch. The stalks rise a foot and a half high, and are garnished with smooth grayish leaves, two inches long, and three quarters of an inch broad at their base, ending in points; these embrace the stalks with their base. The upper part of the stalk has slender branches proceeding from the wings of the leaves, which sustain tufts of small white flowers, having four petals placed in form of a cross. These appear in June, and are succeeded by long, slender, compressed, four-cornered pods, which grow erect close to the stalk, and are filled with small seeds which ripen in August.

The second sort grows naturally upon old walls and buildings in the northern parts of England; the lower leaves are shaped like those of the Daisy, but are rough. The stalks rise eight or ten inches high, which are garnished with oval leaves, whose bases embrace the stalks; they are as rough as the lower leaves. The upper part of the stalks branch into slender stalks, which sustain short spikes of white flowers like those of the former sort, which are succeeded by slender pods having four corners, which are shorter than those of the first sort. This plant flowers earlier than the first, and the seeds are ripe in July.

These plants are sometimes kept in gardens for the sake of variety; but if their seeds are scattered upon an old wall or building, in autumn, soon after they are ripe, the plants will come up and thrive without farther care, and their seeds will scatter on the walls and spread, so there will be no danger of the plants maintaining the situation, if they are not purposely destroyed.

The other species are referred to *Arabis*, *Brassica*, and *Hesperis*, under which articles they will be found.

TUSSILAGO. Tourn. Inst. R. H. 487. tab. 276. Lin. Gen. Plant. 856. Colt's-foot.

The CHARACTERS are,

The flower has one common cylindrical empalement, whose scales are linear, spear-shaped, and equal. The flower is made up of hermaphrodite florets, which compose the disk, and female half florets which form the rays or border. The hermaphrodite florets are funnel-shaped, and cut at the brim into five segments; these have five short hair-like stamina, terminated by cylindrical summits; and a short crowned germen supporting a slender style, crowned by a thick stigma. The germen afterward becomes an oblong compressed seed, crowned with a hairy down. The female half florets are stretched out on one side with a narrow tongue-shaped segment; these have no stamina, but have a short crowned germen, which turns to a seed like those of the hermaphrodite florets, which ripen in the empalement.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which includes those plants whose flowers are composed of hermaphrodite and female florets, which are all fruitful.

The SPECIES are,

1. **TUSSILAGO** (*Farfara*) scapo imbricato unifloro, foliis subcordatis, angulatis denticulatis. Lin. Hort. Cliff. 411. *Colt's-foot with an imbricated stalk bearing one flower, and angular indented leaves which are nearly heart-shaped.* Tusfilago vulgaris. C. B. P. 197. *Common Colt's-foot.*
2. **TUSSILAGO** (*Anandria*) scapo unifloro, subsquamoso erecto, foliis lyrato ovatis. Lin. Sp. 865. *Colt's foot with one flower on each stalk, and oval lyre-shaped leaves.* Tusfilago scapo unifloro, calyce clauso. Hort. Upsal. 259. *Colt's-foot with one flower on each stalk, and a closed empalement.*

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3. TUSSILAGO (*Alpina*) scapo subnudo unifloro, foliis cordato-orbiculatis crenatis. Hort. Cliff. 411. *Colt's-foot with an almost naked stalk bearing one flower, and orbicular, heart-shaped, crenated leaves.* Tussilago Alpina rotundifolia glabra. C. B. P. 197. *Round-leaved smooth Colt's-foot of the Alps.*

The first of these sorts is very common in watery places in almost every part of England, and is rarely kept in gardens; for the roots creep under ground, and increase so fast, that in a short time they will spread over a large spot of ground. This plant is so well known as to need no description.

The second sort grows naturally in Siberia; this is a very low plant, whose leaves grow close to the ground; they are of an oval form, and indented on the sides like a lute. The flowers stand upon short foot-stalks which rise between the leaves, and are three or four inches long, each sustaining one flower at the top, of a dirty purplish colour. These appear early in the spring, and are succeeded by downy seeds which ripen in June.

The third sort grows naturally on the Alps; this is a

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low perennial plant, whose leaves are round, and indented at the foot-stalk in form of a heart, and their edges are crenated; their upper surface is smooth, and of a bright green colour; their under sides are a little downy and whitish; their foot-stalks arise from the ground, and are three inches long. The foot-stalks of the flowers which arise from the root are four inches long, woolly, and sustain one purplish flower at the top, which is made up of hermaphrodite and female florets, like those of the other sorts.

The two last are frequently kept in gardens for the sake of variety; they are easily propagated by parting their roots in autumn, and must be planted in a moist shady border, where they will thrive, and require no farther care but to keep them clean from weeds.

TYPHA. Cat's-tail, or Reed-mace.

Of this there are two species, which grow naturally in standing waters in many parts of England, one with broad, the other with narrow leaves; but as these plants will not live in dry ground, so it will be to no purpose to trouble the reader farther about them.

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VACCARIA. See SAPONARIA.
VACCINIUM. Lin. Germ. Plant. 434.
Vitis Idæa. Tourn. Inst. R. H. 607. tab. 377. The Bill-berry, Whortle-berry, or Cran-berry; in French, *Airelle*, or *Myrtille*.

The CHARACTERS are,

The flower has a small permanent empalement sitting upon the germen; it is bell-shaped, of one petal, which is slightly cut into four segments at the brim, which turn backward; it has eight stamina, which are terminated by horned summits having two awns on their backside which spread asunder; the points open. The germen is situated below the flower, supporting a single style longer than the stamina, crowned by an obtuse stigma; it afterward turns to an umbilicated globular berry with four cells, containing a few small seeds.

This genus is placed in the first section of Linnæus's eighth class, which includes those plants whose flowers have eight stamina and one style.

1. VACCINIUM (*Myrtillus*) pedunculis unifloris, foliis ovatis serratis deciduis, caule angulato. Flor. Lapp. 143. *Whortle-berry with one flower upon each foot-stalk, oval sawed leaves which fall off in winter, and an angular stalk.* Vitis Idæa foliis oblongis crenatis, fructu nigricante. C. B. P. 470. *Black Whorts, Whortle-berries, or Bill-berries.*
2. VACCINIUM (*Vitis Idæa*) racemis terminalibus, nutantibus, foliis obovatis revolutis integerrimis subtus punctatis. Lin. Sp. Plant. 351. *Whortle-berry with nodding branches of flowers terminating the branches, and oval leaves which are entire, turned back, and punctured on their under side.* Vitis Idæa foliis subrotundis non crenatis, baccis rubris. C. B. P. 470. *Red Whorts, or Whortle-berries.*
3. VACCINIUM (*Pensylvanica*) foliis ovatis mucronatis, floribus alaribus nutantibus. *Whortle-berries with oval-pointed leaves, and nodding flowers proceeding from the wings of the stalks.* Vitis Idæa myrtinis foliis, flosculis dependentibus. Pluk. Phyt. tab. 321. fig. 4.

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Whortle-berries with Myrtle leaves, and small depending flowers.

4. VACCINIUM (*Hispidulum*) foliis integerrimis revolutis ovatis, caulibus repentibus, filiformibus, hispidis. Lin. Sp. Plant. 352. *Whortle-berries with oval entire leaves turning back, and a slender, creeping, bristly stalk.* Vitis Idæa palustris Virginiana, fructu majore. Raii Hist. 685. *Marsh Virginia Whorts with a larger fruit.*
5. VACCINIUM (*Oxycoccus*) foliis integerrimis revolutis ovatis, caulibus repentibus filiformis nudis. Lin. Sp. Plant. 351. *Whortle-berries with oval, entire, reflexed leaves, and naked, slender, creeping stalks.* Oxycoccus seu vaccinia palustris. J. B. 1. p. 525. *Whortle-berries, Moss-berries, or Moor-berries; by some called Cran-berries.*

The first sort grows very common upon large wild heaths in many parts of England, but is never cultivated in gardens, it being with great difficulty transplanted; nor will it thrive long when it is removed thither, for from many trials which I have made, by taking up the plants at different seasons with balls of earth to their roots and planting them in gardens, I could never succeed so as to preserve the plants above two years, and those never produced any fruit, so that it is not worth the trouble of cultivating.

The fruit of this sort is gathered by the poor inhabitants of those villages which are situated in the neighbourhood of their growth, and carried to the market-towns. These are by some eaten with cream or milk; they are also put into tarts, and much esteemed by the people in the north, but they are seldom brought to London. The shrub on which these grow rises about two feet high, having many stems, which are garnished with oblong leaves, shaped like those of the Box-tree, but somewhat longer, and are a little sawed on their edges. The flowers are shaped like those of the Arbutus, or Strawberry-tree, of a greenish white colour, changing to a dark red toward the top. The fruit are about the size of large Juniper-berries, and

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of a deep purple colour, having a flue upon them when they are untouched, like the blue Plums, which rub off with handling.

The second sort is of much humbler growth, seldom rising above six or eight inches high. The leaves of this sort are so like that of the Dwarf Box, as that, at a distance, the plants are often taken for it, even by persons of skill. This is an evergreen shrub, which grows upon moory ground in several parts of the North, but it is full as difficult to transplant into gardens as the other sort; though I have been assured by persons of credit, that they have seen this sort planted to make edgings to the borders of the gardens in Norway and Sweden, where the plants may grow much better, from the cold of those climes, than they will do in England, for this is a native of very cold countries. I have several times received plants of this sort from Greenland, by the whale ships. The berries of this sort are red, and have a more agreeable acid flavour than those of the first sort. This fruit is frequently used for tarts in several of the northern countries, where the plants grow wild upon the moors.

The third sort grows naturally in Virginia and other parts of North America; this has a low shrubby stalk like the second; the leaves are small, oval, pointed, and not unlike some sorts of Myrtle; they continue green all the year; the flowers come out from the wings of the leaves at every joint; their foot-stalks are pretty long, and nod downward; they sustain but one flower; they are small, white, and are succeeded by small red berries which seldom ripen here.

The fourth sort grows naturally in marshy grounds in most parts of North America. The stalks of this are slender, imbricated, and trail upon the ground; the scales are bristly; the leaves are oval, entire, and their edges turn backward; the flowers come out from the wings of the stalk; they are of an herbaceous white colour, and in their native soil are succeeded by large red berries, but in England the fruit never comes to perfection.

The plants of this sort are difficult to preserve in England, for they require a moorish boggy soil, which should be covered with Moss, and constantly kept wet, otherwise they will not thrive.

The fifth sort produces long slender branches not bigger than thread, which trail upon the mossy bogs, so are often hid by the Moss. The branches are thinly garnished with small leaves, about the size and shape of those of Thyme, having their upper surface of a shining green colour, but are white underneath.

The flowers are generally produced toward the extremity of the shoots, which are in shape like those of the former sorts, but are smaller, and of a red colour; these grow upon long slender foot-stalks, and are succeeded by round, red, spotted berries, of a sharp acid flavour, which are much esteemed by the inhabitants of the places near the bogs where they grow. Some use them for tarts, and others eat them with milk or cream.

This sort is a native of bogs, therefore cannot by any art be propagated upon dry land; but where there are natural bogs, the plants may be taken up carefully, preserving some of the soil to their roots, and transplanted into the bogs in the autumn; and if they are once fixed in the place, they will spread and propagate themselves in great plenty, and require no farther care.

The two sorts first mentioned also propagate very fast by their creeping roots, so that when they are fixed in a proper soil, they will soon overspread the ground, for the heaths, upon which they naturally grow, are generally covered with the plants. The first sort grows with the Heath, their roots intermixing together, and frequently is found upon sandy heaths in divers parts of England; but the second sort grows only upon moorish land, where, by its creeping roots, the ground is soon covered with the plants.

There are several other species of this genus, some of which are natives of Spain and Portugal, others of

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Germany and Hungary, and several of the northern parts of America, from whence those large fruit are brought to England, which are used by the pastry-cooks of London, during the winter season for tarts; but, as all these sorts naturally grow upon swamps and bogs, they are not easy to transplant into gardens, so as to thrive or produce fruit, therefore there can be little hopes of cultivating them to advantage.

VALANTIA. Lin. Gen. Plant. 1151. Cruciata. Tourn. Inst. 115. Crosswort.

The CHARACTERS are,

It hath hermaphrodite solitary flowers in the place of the germen, of one leaf, cut into four oval acute segments, and four stamina as long as the petals, terminated by small summits, with a large germen supporting a slender style the length of the stamina, crowned by beaded stigmas; the empalement afterward becomes a thick compressed capsule, containing one globular seed.

This genus of plants is ranged in the first section of Linnæus's twenty-third class, intitled Polygamia Monœcia, which includes those plants which have male, female, and hermaphrodite flowers on the same plant.

The SPECIES are,

1. **VALANTIA** (*Hispida*) floribus masculis trifidis hermaphroditici germini hispido insidentibus. Lin. Sp. 1490. *Valantia with three male flowers sitting on the hispid germen of the hermaphrodite flowers.* Aparine femine Coriandri faccharati. Park. Theat. 576. *Goose-grass like a Coriander comfit.*
2. **VALANTIA** (*Muralis*) floribus masculis trifidis hermaphroditici germini glabro insidentibus. Sauv. Monsp. 162. *Valantia with three male flowers sitting on the smooth germen of the hermaphrodite.* Cruciata muralis minima Romana. Col. Ecphr. 1. p. 298.
3. **VALANTIA** (*Aparina*) floribus masculis trifidis pedicellatis hermaphroditici pedunculo insidentibus. Hort. Upsal. 302. *Valantia with trifid male flowers sitting on the foot-stalks of the hermaphrodite flowers.* Aparine femine lævi. Vaill. Paris. 18. *Goose-grass with a smooth seed.*
4. **VALANTIA** (*Articulata*) floribus masculis quadrifidis, pedunculis dichotomis nudis foliis cordatis. Hort. Upsal. 303. *Valantia with male flowers which are quadrifid, the knots of the forked stalks naked, and heart-shaped leaves.*
5. **VALANTIA** (*Cruciata*) floribus masculis quadrifidis, pedunculis diphyllis. Hort. Upsal. 303. *Valantia with quadrifid male flowers, whose foot-stalks have two leaves.* Cruciata hirsuta. C. B. P. 335. *Hairy Crosswort.*

These plants are seldom cultivated except in botanic gardens for variety. The four sorts first mentioned are trailing annual plants; if these are permitted to scatter their seeds in autumn, the plants will come up, and require no farther care but to thin them, and keep them clean from weeds.

The fourth sort is an abiding plant; this grows naturally in many parts of England; the roots are yellow, and spread greatly in the ground; the stalks have four leaves at each joint, placed in form of a cross; the flowers are yellow, sitting in whorls round the stalks. It is sometimes used in medicine, but is generally gathered in places where it grows naturally.

VALERIANA. Tourn. Inst. R. H. 131. tab. 52. Lin. Gen. Plant. 43. Valerian.

The CHARACTERS are,

The flower has a small empalement; it has one tubulous petal cut into five segments at the brim, with a gibbous honey gland on the inside; it has three small, erect, awl-shaped stamina the length of the petals, terminated by roundish summits. The germen is situated under the flower, supporting a slender style crowned by a thick stigma; it afterward turns to a crowned capsule which falls off, in which is lodged a single seed.

This genus of plants is ranged in the first section of Linnæus's third class, which contains those plants whose flowers have three stamina and one style.

The SPECIES are,

1. **VALERIANA** (*Phu*) floribus triandris, foliis caulinis pinnatis, radicalibus indivisis. Hort. Upsal. 13. *Valerian*

- rian with flowers having three stamina, winged leaves to the stalks, and those at the root undivided. Valeriana hortensis. Dod. Pempt. 342. Garden Valerian.
2. VALERIANA (*Officinalis*) floribus triandris, foliis omnibus pinnatis. Hort. Cliff. 15. Valerian with three stamina to the flowers, and all the leaves winged. Valeriana sylvestris major. C. B. P. 164. Greater wild Valerian.
 3. VALERIANA (*Rubra*) floribus monandris caudatis, foliis lanceolatis integerrimis. Hort. Cliff. 15. Valerian with flowers having tails, one stamina, and spear-shaped entire leaves. Valeriana rubra. C. B. P. 165. Red Valerian.
 4. VALERIANA (*Angustifolia*) floribus monandris caudatis, foliis linearibus integerrimis. Valerian with tailed flowers having one stamina, and linear entire leaves. Valeriana rubra angustifolia. C. B. P. 165. Narrow-leaved red Valerian.
 5. VALERIANA (*Calcitrapa*) floribus monandris, foliis pinnatifidis. Hort. Upsal. 14. Valerian with flowers having one stamina and wing-pointed leaves. Valeriana foliis calcitrapæ. C. B. P. 164. Valerian with leaves like those of the Star-thistle.
 6. VALERIANA (*Pyrenaica*) floribus triandris, foliis caulinis cordatis ferratis petiolatis, summis ternatis. Hort. Cliff. 15. Valerian with three stamina to the flowers, and heart-shaped sawed leaves growing on foot-stalks, placed by threes at the top. Valeriana maxima Pyrenaica, calicæ folio. Tourn. Inst. R. H. 131. The largest Pyrenean Valerian with a foreign Colt's-foot leaf.
 7. VALERIANA (*Celtica*) floribus triandris, foliis ovato-oblongis obtusis integerrimis. Lin. Mat. Med. 23. Valerian with three stamina to the flowers, and oblong, oval, blunt, entire leaves. Nardus Celtica. J. B. 3. p. 205. Celtic Nard.
 8. VALERIANA (*Siberica*) floribus tetrandis æqualibus, foliis pinnatifidis, femibus paleâ ovali adnatis. Hort. Upsal. 13. Valerian with four equal stamina to the flowers, wing-pointed leaves, and seeds fastened by an oval husk. Valeriana lutea humilis. Amman. Ruth. 18. Low yellow Valerian.
 9. VALERIANA (*Locusta*) floribus triandris caule dichotomo, foliis linearibus. Flor. Suec. 32. Valerian with a forked stalk and linear leaves. Valeriana arvensis, præcox humilior, femine compresso. Mor. Umb. 53. Corn-sallad or Lamb's-lettuce.
 10. VALERIANA (*Vesicaria*) caule dichotomo, foliis lanceolatis ferratis, calycibus inflatis. Hort. Cliff. 16. Valerian with a forked stalk, spear-shaped sawed leaves, and swollen empalements. Valerianella Cretica, fructu vesicario. Tourn. Cor. 6. Candia Lamb's-lettuce with a bladder fruit.
 11. VALERIANA (*Coronata*) caule dichotomo, foliis lanceolatis dentatis, fructu sexdentato. Hort. Cliff. 16. Valerian with a forked stalk, spear-shaped indented leaves, and a fruit having six indentures. Valerianella femine stellato. C. B. P. 165. Lamb's-lettuce with a starry fruit.
 12. VALERIANA (*Cornucopia*) floribus diandris ringentibus, foliis ovatis sessilibus. Hort. Cliff. 15. Valerian with a ringent flower having two stamina, and oval leaves set close to the stalk. Valerianella cornucopoides, flore galeato. Mor. Umb. Lamb's-lettuce with a helmet flower like those of the Cornucopia.

There are several other species of this genus, some of which grow naturally in England, and others in different parts of Europe; but as they are seldom cultivated in gardens, they are omitted, lest the work should swell too much beyond its intended bulk.

The first of these sorts grows naturally in Alsatia, but is propagated in England for medicinal use, and is called in the shops by the name of Phu, to distinguish it from the Mountain Valerian, which is also used in medicine, and is preferred to all the other sorts by the modern physicians; though the roots of this first are still continued in some of the capital medicines, and are by some esteemed equal in virtue, if not superior, to the wild sort.

This hath thick, fleshy, jointed roots, which spread near the surface of the ground in a very irregular manner, crossing each other, and matting together by

their smaller fibres; these have a very strong scent, especially when dry. The lower leaves, which rise immediately from the root, are many of them entire; others are divided into three, five, or seven obtuse lobes; they are of a pale green colour and smooth. The stalks rise three or four feet high; they are hollow, and send out branches from their side by pairs, and are garnished with winged leaves, placed opposite at each joint, which are composed of four or five pair of long narrow lobes terminated by an odd one. The stalks, and also the branches, are terminated by flowers disposed in form of an umbel; they are small, tubulous, white, and cut slightly at the brim into five parts; these appear in May and June, and are succeeded by oblong flat seeds having a downy crown. This plant is propagated by parting of its roots, either in the spring or autumn, but the latter is much preferable to the former, which should be planted in beds of fresh dry earth, about two feet asunder, for they commonly spread and multiply very fast. If the season is dry, you must water the plants until they have taken root; after which they will require no further care, but to keep them clean from weeds; and in autumn, when their leaves are decayed, the roots should be taken up and dried for use.

The second sort is generally found upon dry, chalky soils in shady places, in divers parts of England. The roots of this, which grow wild upon such soils, are much preferable to those of the same kind which are cultivated in gardens; which is also the same of all the sorts of aromatic plants, when gathered from their native places of growth, where they are smaller, but have a stronger flavour.

The roots of this plant are composed of long fleshy fibres which are slender, and unite in heads. All the leaves of this sort are winged; those at the bottom are composed of broader lobes than those on the stalks, and are notched on their edges; they are composed of six or seven pair of lobes terminated by an odd one; these end in acute points, and are hairy. The stalks, in their natural situation, seldom grow much more than a foot high; but, when the roots are cultivated in a garden, they grow more than twice that height; these are channelled, hollow, hairy, and are garnished at each joint with two winged leaves placed opposite, whose lobes are very narrow and almost entire. At the upper part of the stalk comes out two small side branches opposite; these, and also the principal stalk, are terminated by clusters of flowers formed into a kind of umbel, which are shaped like those of the first sort, but are smaller, and have a tinge of purple on their outside. It flowers about the same time with the first sort.

This plant may also be propagated by parting the roots either in spring or autumn, as was directed for the first sort, but you should always observe to plant them upon a dry, fresh, undunged soil, in which, though the roots will not make near so great progress as in a rich moist soil, yet they will be much preferable to them for use. These roots should also be taken up when the leaves decay in autumn, and preserved dry until used.

The third sort grows naturally in rough stony places in the south of France, and in Italy, but has been long cultivated in the English gardens for ornament.

The roots of this sort are ligneous, and as thick as a man's finger, spreading out on every side very wide. The stalks rise about three feet high; they are round, smooth, of a grayish colour, and hollow; these are garnished at each joint with smooth spear-shaped leaves near three inches long and one broad, drawing to a point at each end; they are generally placed by pairs, but sometimes there are three at the same joint standing round the stalk. The upper part of the stalk sends out branches by pairs, which, with the principal stalk, are terminated with red flowers growing in clusters, which have long tubes, cut into five parts at the top, and from the tube is sent out a spur or heel like the flowers of Larkspur. It flowers most part of summer, and the seeds ripen accordingly in succession; these;

these have a down, by which they are transported to a good distance.

There is a variety of this with white flowers, and one with pale flesh-coloured flowers, but they do not differ in any other respect.

It is easily propagated by parting of the roots in autumn, or by sowing of the seeds soon after they are ripe, in a shady border, where the plants will sometimes come up the same autumn, especially if the season proves moist, otherwise they will not appear till the following spring. When these are fit to remove, they should be transplanted into beds at about nine inches or a foot asunder, observing to water them till they have taken new root; after which they will require no farther care but to keep them clear from weeds, and in autumn they must be transplanted where they are to remain.

These plants grow large, therefore should have room, so are not proper furniture for small gardens. When the seeds of these plants light on joints of old walls or buildings, the plants will come up, and thrive as well as in the ground, and will continue much longer, so the seeds may be scattered between the stones of grottos and such like buildings, where the plants will flower from May till the frost stops them, and will make a good appearance.

The fourth sort grows about Montpelier, and upon Mount Baldus in Italy. The root of this is ligneous, but not so large as that of the former sort; the stalks rise two feet high or better, and branch out on each side from the root to within six inches of the top; these are garnished with leaves which are three or four inches long, but are as narrow as those of Flax. The upper part of the stalk is naked, and terminated by a compact cluster of bright red flowers shaped like those of the former sort, but smaller. This flowers about the same time as the last, and may be propagated in the same way.

The fifth sort grows naturally in Spain and Portugal; it is an annual plant, which perishes soon after the seeds are ripe. The lower leaves, which spread on the ground, are cut into many obtuse segments; the stalks, when the plants are in good ground, will rise near a foot and a half high, but upon dry stony soils not half so high, and when they grow out of the joints of old walls, not more than three inches high; these are hollow, smooth, and round, sending out branches by pairs from the upper joints; they are garnished with wing-pointed leaves, whose lobes or segments are very narrow. The stalk and branches are terminated by tufts of flowers shaped like those of the Garden Valerian, but are smaller, and have a flesh-coloured tinge at the top. The seeds have a down, which helps to spread them, so it propagates without care.

The sixth sort grows naturally on the Pyrenean Mountains; this has a fibrous perennial root, from which come out many heart-shaped leaves, standing upon foot-stalks more than a foot in length. The leaves are four inches over each way; they are bluntly sawed on their edges, of a bright green on their upper side, and smooth, but their under side is pale, and a little hairy. The stalks rise three feet high; they are hollow, channelled, and send out branches opposite toward the top, and are garnished with leaves placed opposite, which are shaped like those below, but are a little pointed; and frequently at the top there are three leaves placed round the stalks, standing upon short foot-stalks. The stalk and branches are terminated by pale flesh-coloured flowers, disposed in form of umbels, which have very short spurs or heels. It flowers in June, and the seeds ripen in August, which are crowned with down, whereby they are transported to a distance.

This plant delights in shade and a moist soil; it may be propagated by sowing of the seeds on a shady border soon after they are ripe, and when the plants come up, they should be treated in the same way as is before directed for the third sort.

The seventh sort grows naturally upon the Alps and Syrian Mountains; this was sent me by Dr. Allione from

Turin, who gathered it on the Alps near that place; it is a very humble plant. The stalks trail upon the ground among the Moss, and put out roots at their joints, which swell into knobs or tubers.

The leaves are oblong, oval, and entire; the flower-stalks rise three or four inches high, and are garnished with two or three pair of small oval leaves; the flowers are small, of a pale incarnate colour, and are formed in a loose spike sitting very close to the stalk. It flowers in June, but does not produce seeds here. This plant is difficult to preserve in gardens, for it naturally grows upon rocky mountains which are covered with Moss, where the snow continues six or seven months, so it requires a very cold situation and a stony soil.

The eighth sort grows naturally in Siberia; this is a biennial plant, which flowers and produces seeds the second year and then decays. The leaves of this are winged; the lobes of the lower leaves are oblong, oval, and end in roundish points; the stalks rise a foot high, and are garnished with leaves composed of four or five pair of lobes, terminated by a broad one, which is cut into three or five points. The lobes of these are acute-pointed; these leaves are placed by pairs, and sit close to the stalks; they are smooth, and of a pale yellowish colour. The upper part of the stalk has two pair of branches; the lower pair are near three inches long, but the upper are not half that length: these, and also the principal stalk, are terminated by bright yellow flowers collected in a sort of umbel, which are shaped like those of the first sort. It flowers in July, and the seeds ripen in autumn; it is propagated by seeds, which should be sown where the plants are to remain; this may be performed either in autumn, soon after they are ripe, or in the spring; they have succeeded with me equally at both seasons. When the plants come up, they must be thinned where they are too close, and kept clean from weeds, which is all the culture they require.

The ninth sort is the common Corn-fallad which is cultivated in gardens, but is found growing naturally upon arable land among the Corn in many parts of England; this is an annual plant, which dies when it has perfected its seeds. The lower leaves of this are oblong, and broad at their points, which are rounded, and narrowed at their base, where they embrace each other; these are from three quarters of an inch to two inches long, in proportion to the goodness of the ground. From between the leaves arises an angular stalk, from three to eight or nine inches high, which divides into two branches which spread from each other, and these both divide again into two other in like manner. The stalks are garnished with leaves shaped like those at the bottom, but are smaller; these are placed by pairs at each joint. The branches are terminated by clusters of white flowers, shaped like those of the other species, which are succeeded by pretty large roundish seeds a little compressed on one side. It flowers in June, and the seeds ripen in August, which are very apt to drop before they have changed colour.

It is propagated as a fallad herb for the spring, but having a strong taste which is not agreeable to many palates, it is not so much in use as it was formerly: it is propagated by seeds, which should be sown in autumn on the spot where they are to grow for use. If they are sown the latter end of August, the first rains will bring up the plants; these should be hoed to thin them where they are too close, and to destroy the weeds. Early in the spring the plants will be fit for use. The younger the plants are when used, the less strong will be their taste, so they may supply the table in a scarcity of other herbs. When the seeds of this sort are sown in the spring, if the season proves dry, the plants will not appear till autumn or the spring following; besides, in summer the herb is not fit for use. I have known the seeds of this plant lie in the ground many years when they have happened to be buried deep, and upon being turned up to the air, the plants will come up as thick as if the seeds had been newly sown.

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There are two other species of this which grow naturally in England, but as they are seldom admitted into gardens, I have not enumerated them; these are by some supposed to be only accidental varieties, but I have sown them all several years, and have never found either of them alter.

The tenth sort grows naturally in Candia; this is an annual plant, whose stalks rise six or eight inches high, and divide by pairs like the former. The leaves are much narrower than those of the former, end in acute points, and are sawed on their edges; the flowers are like those of the former sort, but have a swollen bladder empalement which incloses the seeds.

The eleventh sort grows naturally in Italy. The leaves at bottom are three or four inches long, round-pointed, and deeply notched on their edges; the stalk rises near a foot high, sending out branches by pairs from the joints below; the upper part divides by pairs in the same manner as the two former. The flowers are collected in globular heads; they are of an herbaceous white colour, and are succeeded by starry fruit having six indentures. It flowers in June, and the seeds ripen in August; this and the former sort are supposed to be only varieties arising from the same seeds, but I have sown them more than forty years, and have not observed either of them vary.

The twelfth sort grows naturally in the arable fields in Sicily and Spain; this is an annual plant. The stalks are pretty thick, channelled, and of a purplish colour; they rise eight or nine inches high, and are garnished by oval smooth leaves placed by pairs at each joint, fitting close to the stalks; they are an inch and a half long, and an inch broad, of a lucid green. From each side of the stalk springs out slender branches, but the upper part divides into two spreading branches like the other. The joints are swelling, and these branches divide again by pairs; these are terminated by clusters of red flowers, shaped like those of the red Valerian, but larger; they have two leaves close under the bunches, embracing the stalks with their base. When the flowers are past, the fruit stretches out in shape of a cornucopia or horn of plenty. The flowers appear in June, and the seeds ripen in autumn.

These three sorts are propagated by seeds, which should be sown in autumn where the plants are to remain. When these come up, they will require no other culture but to thin them where they are too close, and keep them clean from weeds. The plants which rise in autumn, will live through the winter, and come early to flower the following summer, so will produce good seeds; whereas those which rise in the spring, do not ripen their seeds unless the season proves warm.

VALERIANA GRÆCA. See POLEMONIUM.

VALERINELLA. See VALERIANA.

VANILLA. Plum. Gen. Nov. 25. tab. 28. Epidendrum. Lin. Gen. Plant. 907.

The CHARACTERS are,

It has a single stalk. The flowers are included in sheaths, which are distant from each other; they sit upon the germen, and have no empalement; they have five oblong petals which spread open very wide, and turbinate nectariums, whose bases are tubulous, situated on the back side of the petals in the middle; their brims are oblique and bifid; the upper lip is short and trifid; the under one runs out in a long point; they have two very short stamina sitting upon the pointal, and the summits are fastened to the upper lip of the nectarium; they have a long, slender, contorted germen situated under the flower, supporting a short style fastened to the upper lip of the nectarium, crowned by an obsolete stigma. The germen afterward becomes a long, taper, fleshy pod, including many small seeds.

This genus of plants is ranged in the second section of Linnæus's twentieth class, which includes those plants whose flowers have two stamina which are connected with the style.

The SPECIES are,

1. VANILLA (*Mexicana*) foliis oblongo-ovatis mucronatis, nervosis, floribus alternis. *Vanilla with oblong,*

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oval, acute-pointed, veined leaves, and flowers growing alternately. Volubilis filiquosa Mexicana, plantaginis folio. Cat. Car. 3. p. 7. Mexican Climber having pods, and a Plantain leaf.

2. VANILLA (*Axillaribus*) foliis oblongis obtusis, compressis articulatis, floribus alaribus. *Vanilla with oblong, blunt, compressed, jointed leaves, and flowers proceeding from the sides of the stalks.*

The first sort is that which the Spaniards cultivate in the West-Indies, which we shall describe hereafter.

The second sort was sent me from Carthagena in New Spain, where it grows naturally; this has a climbing stalk, which sends out roots from the joints, which fasten to the stems of trees or any neighbouring support, and climb to a great height. The leaves, which come out singly at each joint, are oblong, smooth, and jointed. The flowers come out from the side of the branches; they are shaped like those of the great Bee Orchis, but are longer. The galea or helmet of the flower is of a pale Pink colour, and the labia is purple. This plant flowered in the Chelsea Garden, but wanting its proper support, it lived but one year.

There are two or three varieties of the first sort, which differ in the colour of their flowers and the length of their pods; and there are many other species which grow naturally in both the Indies, which have been brought to this genus, but those above-mentioned are all I have seen growing.

The plant which produces the fruit called Vanilla or Banilla, by the Spaniards, hath a trailing stem, somewhat like common Ivy, but not so woody, which fastens itself to whatever tree grows near it, by small fibres or roots which are produced at every joint, which fasten to the bark of the tree, and by which the plants are often nourished, when they are cut or broken off from the root a considerable height from the ground, in like manner as the Ivy is often seen in England. The leaves are as large as those of the common Laurel, but are not quite so thick; these are produced alternately at every joint (which are six or seven inches asunder,) and are of a lively green colour on the upper side, but of a paler green underneath. The stems of these plants shoot into many branches, which fasten themselves also to the branches of the trees, by which means they rise to the height of eighteen or twenty feet, and spread quite over some of the smaller trees to which they are joined. The flowers are of a greenish yellow colour, mixed with white, which, when fallen, are succeeded by the fruit, which are six or seven inches long.

This sort, which is manufactured, grows not only in the Bay of Campeachy, but also at Carthagena, at the Caraccas, Honduras, Darien, and Cayan, at all which places the fruit is gathered and preserved, but is rarely found in any of the English settlements in America at present, though it might be easily carried thither and propagated; for the shoots of these plants are full of juice, so may be easily transported, because they will continue fresh out of the ground for several months. I had some branches of this plant which were gathered by Mr. Robert Millar at Campeachy, and sent over between papers by way of sample; these had been at least six months gathered when I received them, and upon opening the papers, I found the leaves rotten with the moisture contained in them, and the paper was also perished with it, but the stems appeared fresh; upon which I planted some of them in small pots, and plunged them into a hot-bed of tanners bark, where they soon put out leaves, and send forth roots from their joints; but, as these plants naturally fasten themselves to the stems of the trees, in the woods where they grow naturally, it is with great difficulty that they are kept alive when they have not the same support; therefore, whoever would preserve any of these plants in Europe, should plant them in tubs of earth, near the stem of some vigorous American tree, which requires a stove, and can bear a great deal of water, because the Vanillas must be plentifully watered in the summer season, other-

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wife they will not thrive. They require also to be shaded from the sun by trees, so that if these are planted at the foot of the *Hernandia*, or *Jack-in-a-box*, whose leaves are very large and afford a good shade, they will succeed better than when they are exposed in single pots alone; and as these plants require the same degree of heat in winter, they will agree well together.

When these plants are designed for propagation in the warm parts of America, there is nothing more required than to make cuttings of about three or four joints in length, which should be planted close to the stems of trees, in low marshy places; and to keep down other troublesome plants, which, if permitted to grow about the cuttings before they are well rooted, would overbear and destroy them; but after they are established, and have fastened their shoots to the stems of the trees, they are not in much danger of being injured by neighbouring plants, and when the ground is kept clear from weeds, the plants will be much better nourished.

These plants do not produce flowers until they are grown strong, so that the inhabitants affirm, That it is six or seven years from the planting to the time of their bearing fruit; but when they begin to flower and fruit, they continue for several years bearing, and this without any culture; and as it is a commodity which bears a good price, it is well worth cultivating in several of the English settlements, especially as they will grow on moist woody places, where the land is not cleared from timber.

The method used to prepare the fruit is, when it turns of a yellow colour, and begins to open, to gather it, and lay it in small heaps to ferment two or three days, in the same manner as is practised for the *Cocoa* or *Chocolate* pods; then they spread them in the sun to dry, and when they are about half dried, they flat them with their hands, and afterwards rub them over with the oil of *Palma Christi*, or of the *Cocoa*; then they expose them to the sun again to dry, and afterward they rub them over with oil a second time, then they put them in small bundles, covering them with the leaves of the *Indian Reed*, to preserve them.

These plants produce but one crop of fruit in a year, which is commonly ripe in May, fit for gathering, for they do not let them remain on the plants to be perfectly mature, because then they are not so fit for use; but when they are about half changed yellow, they esteem them better for keeping, than when they are changed to a dark brown colour, at which time the fruit splits, and shews a great quantity of small seeds, which are inclosed within it. While the fruit is green, it affords no remarkable scent, but as it ripens, it emits a most grateful aromatic odour. When the fruit begins to open, the birds attack them and devour all the seeds very greedily, but do not eat any other part of the fruit.

The fruit which are brought to Europe, are of a dark brown colour, about six inches long, and scarce an inch broad; they are wrinkled on the outside, and full of a vast number of black seeds, like grains of sand, of a pleasant smell, like *Balsam of Peru*.

The fruit is only used in England as an ingredient in *Chocolate*, to which it gives a pleasant flavour to some palates, but to others it is very disagreeable; but the Spanish physicians in America use it in medicine, and esteem it grateful to the stomach and brain, for expelling of wind, to provoke urine, to resist poison, and cure the bite of venomous animals.

As this plant is so easily propagated by cuttings, it is very strange that the inhabitants of America should neglect to cultivate it, especially as it is an ingredient in their *Chocolate*, which is so much drank all over America; but as the English have in a manner quite neglected the culture of the *Cocoa*, it is no wonder they should neglect this, since the former was cultivated in great plenty by the Spaniards in *Jamaica*, while that island remained in their possession, so that the English had an example before them, if they would have followed it; whereas the *Vanilla* was not

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found growing there, and therefore it is not to be supposed, that the persons who were so indolent as to quit the culture of many valuable plants then growing on the spot, should be at the trouble of introducing any new ones.

VAPORIFEROUS signifies causing or producing vapours.

VAPOUR is by some defined to be a thin vesicle of water, or other humid matter, filled or inflated with air, which, being rarefied to a certain degree by the action of heat, ascends to a certain height in the atmosphere, where it is suspended till it returns in form of rain, snow, or the like.

Some use the term *Vapour* indifferently for all fumes emitted, either from moist bodies, as fluids of any kind, or from dry bodies, as sulphur, &c. but Sir *Isaac Newton*, and other authors, better distinguish between humid and dry fumes, calling the latter exhalations.

VAPOURS are defined by naturalists to be those watery particles which are severed from others by the motion of the air, and are carried about in it several ways according as the wind, or warmth of the air serves; they rise out of the sea, rivers, lakes, and other waters.

As to their hanging in the air, we may observe, in a hot day, when there is no wind stirring, such a company of Vapours to rise out of moist ground, as make thick fogs, which are sometimes higher, and sometimes lower, as the multitude and motion of the Vapours happen to be. They are to be seen as well upon high grounds as low.

They are easily dissipated by the wind, and particularly if it be a drying wind.

The sun has the same effect upon them, and we commonly see, when there are thick fogs about sun-rising, they disappear a little after it is up.

It is evident that fogs consist of aqueous particles rarefied, because they mightily bedew every thing that lies open to them. These particles, being soundly moved, must needs fly aloft into the air, but if their motion be something faint, they play about the surface of the earth; for this is agreeable to the laws of motion, that such things as are about the globe of the earth, the more they are moved, the more they recede from the center of the earth.

Again, these fogs arise out of all places, mountainous or champaign, and continue till they are dispelled by wind or heat; but they continue longest in the lowest grounds, because those places are fullest of moisture, and are not so much exposed to the winds; but wherever they be when the wind rises upon them, they are dissipated and driven about, till we see no more of them.

So in like manner, the heat of the sun, by putting them into a brisker motion, either dissipates them by rarefaction, or raises them higher, and forms them into clouds.

And whereas sometimes the fogs stink, it is not because they come from stinking water, but because the Vapours are mixed with sulphureous exhalations, which smell so. Perhaps these exhalations would fly up directly to the clouds, if there were no fogs to hold them, and so would not affect the sense of smelling; but when they are once entangled and blended with the fog, they last as long as that does.

The clouds are higher than the fogs; they hang in the air, and are carried about in it by the winds. The clouds are of various figures, and sometimes so thin, that the rays of the sun pass through them, but at other times they are thick enough to intercept and obstruct them; they also appear of several colours, as white, red, and sometimes very dark.

The thickness of the clouds proceeds from the closeness of the vaporous particles one to another, and their thinness from the distance of those particles one from another, of which there are several causes. When they are very thin, they leave so many interstices, that the rays of the sun dart through them in many places, but are intercepted in others.

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As to the variety of the figures of the clouds, they arise from their plenty of Vapours, and the influence of the sun and wind, for they cannot be variously condensed, rarefied, and carried about in the air, but their figure must needs be changed.

To account for the clouds hanging in the air, is a matter of some difficulty.

All the watery particles, of which they consist, are heavier than air; and so, if there were nothing to hinder them, they would fall to the earth; but there are two things that seem to keep them up.

1. The winds which blow from all parts, under the region of the clouds, and bear about with them many lighter sorts of bodies; especially if those bodies contain but a small quantity of solid matter under a broad superficies. And thus it is visible, how easily paper kites are kept up by the wind, when they are mounted pretty high; and so the particles of water, pretty much rarefied, may easily be suspended at that height.

2. New exhalations and vapours are perpetually fuming out of the earth; and, by their moving upwards, prevent the clouds from descending; unless the density of the clouds overweigh them. Thus we see the Vapour of fire carries lighter bodies up the chimney; and smoke can turn a thin plate of iron, artfully placed in it, so strongly, as to turn about a spit, and roast meat.

It is a question among naturalists, Whether clouds and thicker fogs are composed alike; or, Whether there be something more in the clouds?

Some think that clouds are grosser than all fogs, and that they are composed of flakes of snow, rather than particles of water, such as make fogs.

Others say, It is enough to consider clouds as a closer sort of fogs, and indeed the fogs that hang upon the tops of very high hills, appear to people in the plains to be all one with clouds, tho' those that are at them, perceive nothing but a thick fog.

There being always many Vapours in the air, though not always visible, it comes to pass that great dews fall even in clear weather, and especially in those countries where it seldom rains; for when it happens that the scattered Vapours are collected and condensed together, and forced downwards, they must needs fall, and bedew plants and Grass.

The time for the falling of the dew, is either before the rising of the sun, or after the setting of it; but in order to its falling regularly at those times, it is necessary that the air be calm, for windy or stormy weather hinders it; but when the weather is calm, and gentle breezes are felt from the west about the time that the sun sets, and from the east about the rising of it, it is probable they collect the Vapours, and precipitate them, by moderately cooling the air; and because the morning breezes are more general than the evening ones, therefore the evening dews fall only here and there, but the morning ones seldom fail of being universal.

It is likewise found by experience, that the dews are more copious in hotter countries than in cold; the reason of which seems to be this, that the heat of the sun does, in the day time, raise abundance of Vapours out of the water, which Vapours are so extremely rarefied by the same heat, that they are dispersed far and wide; but the cool of the night brings them together again, and condenses them to that degree, that they fall to the ground, but not in such large drops as rain does.

But in colder countries, where there are frequent rains, and the Vapours are less rarefied, most of them come down in rain, and but a small part turns to dew.

A certain author says, That in some of the hotter climates, the earth is without rain for six or seven months together; and it is every summer season so much parched and dried, that there is hardly any moisture to be found in it for three or four feet deep; and during that time the heats are so excessive, that without the refreshing dews of the nights (which are there very

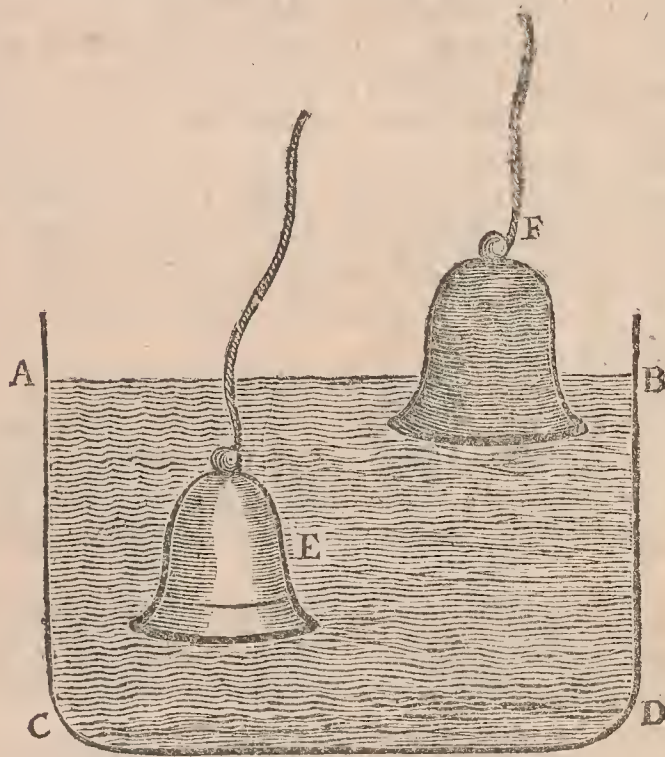
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considerable) the plants must inevitably perish; for there is no moisture they can have but from the dews, and yet that moisture supports the trees and plants in a flourishing state. Toward the end of the day the leaves contract themselves, by reason of the excessive heat of the sun; but by the falling of the dews at night, they expand and open themselves, so that in the morning and fore part of the day they have a most agreeable verdure; and also this moisture of the dews, affords sufficient nourishment to the plants to bring the fruits to perfection.

By a great many observations made by Mr. Henry Beighton, F. R. S. and Dr. J. T. Defaguliers, to raise water by fire, according to Mr. Newcome's improvement of it, they found that the water by boiling, was expanded 14,000 times, to generate steam as strong (i. e. as elastic) as common air, which therefore must be near 16½ times specifically lighter.

And it is plain, that this steam is not made of the air extricated out of the water, because it is condensed again into water by a jet of cold water spouting into it; and the little quantity of air that comes out of the injected water must be discharged at every stroke, otherwise the engine will not work well.

E X P E R I M E N T.



ABCD represent a pretty large vessel of water, which must be set on the fire to boil. In this vessel must be suspended the glass bell E, made heavy enough to sink in water, but put in, in such a manner, that it be filled with water when upright, without any bubbles of air at its crown within, the crown being all under water.

As the water boils, the bell will by degrees be emptied of its water, being pressed down by the steam which rises above the water in the bell; but as that steam has the appearance of air, in order to know whether it be air or not, take the vessel off the fire, and draw up the bell by a string fastened to its knob or top, then, as the steam condenses by the cold air on the outside of the bell, the water will rise up into the bell at F, quite to the top, without any bubble above it; which shews that the steam that kept out the water was not air.

N B. This experiment succeeds best when the water has been first purged of air, by boiling and the air-pump.

We know, by several experiments made on the fire-engine, (in Capt. Savory's way, where the steam is made to press immediately on the water,) that steam will drive away air, and that in proportion to its heat, though in the open air it floats and rises in it like smoke.

Now if the particles of water turned into steam or Vapour repel each other strongly, and repel air more than they repel each other, aggregates of such particles made of Vapour and vacuity may rise in air of different densities, according to their own density, dependent on their degree of heat, without having recourse

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course to imaginary bubbles, formed in a manner only supposed, and not proved.

Indeed he owns, that if the watery particles had no repellent force, they must precipitate in the same manner that dust will do after it has been raised up; but there are too many observations and experiments, to leave any doubt of the existence of repellent force above-mentioned.

“ And that he cannot shew by any experiment, how
“ big the molecule of Vapour must be which will
“ exclude air from their interstices; nor that these
“ molecule do vary in proportion to the degree of
“ heat by an increase of repellent force in each wa-
“ tery particle, or by a farther division of the parti-
“ cles still less; but in the general we may reasona-
“ bly affirm, that the rarity of the Vapour is pro-
“ portionable to the degree of its heat, as it happens
“ in other fluids. (See *Philos. Transf.* N° 270.) And
“ though the different degrees of the air’s rarefac-
“ tion are also proportionable to the heat, yet the
“ same degree of heat rarefies vapours much more
“ than air.”

Now to shew that what has been said will account for the rise of Vapours, and formation of clouds, we must only consider whether that degree of heat which is known to rarefy water 14,000 times, being compared with several of those degrees of heat in summer, autumn, and winter, which are capable of raising exhalations from water or ice (the rarity of Vapours being considered,) will appear to be such, that the Vapour will rise high enough in winter, but not too high in summer, to agree with the known phenomena. That the effects are adequate to the causes in this case, he thinks may be made out in the following manner, viz.

The heat of boiling water, according to Sir Isaac Newton’s table (*Philosoph. Transact.* N° 273,) is 34, the mean heat of summer 5, the mean heat of spring or autumn 3, and the least degree of heat, at which Vapours rise in winter (alias the mean heat of winter) is 2.

The rarity of Vapour proportionable to these four degrees of heat is 24,000, 2058, 1235, and 823.

The rarity of air is in summer 900, in spring or autumn 850, and in winter 800.

The density of water, compared with the above-mentioned densities, being inversely as one to the afore-mentioned four numbers.

The height above the earth to which the Vapours will arise, and at which they will be in equilibrio, in an air of the same density with themselves, will vary according to the rarity of the Vapour depending on the heat of the season.

For the Vapour which is raised by the winter’s heat, expressed by the number 2, when the rarity of the air is 800, will rise to (and settle at) an height of about the sixth part of a mile, when the barometer is above thirty inches high.

But if the heat be greater, then the Vapours will rise higher; and pretty much higher if the sun shines, though in frosty weather, the barometer then being very high.

If the barometer falls, and thereby brings the place of the equilibrium (for Vapours raised by heat 2) nearer the earth, then also will the heat be increased, the Vapour more rarefied, and consequently the new place of equilibrium sufficiently high.

It is to be observed, that in winter when the heat is only equal to 2, the air is denser close to the earth, which has not any heat sufficient to rarefy it near the ground, as happens in warm weather; therefore the Vapour will rise gradually in an air whose density decreases continually from the earth upwards, neither will the Vapour be hindered of its full rise by any condensation from a greater cold of the ambient air; the air being then as cold next to the ground, where the vapour begins to rise, as it is at any height from the earth.

The Vapour which is raised by the heat of the spring or autumn, expressed number 3, will rise to the

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height of $3\frac{1}{2}$ miles when the barometer is at 30, and the rarity of the air is 850. But then as the air is hotter near the ground than at the height of half a mile or a mile, the Vapour will condense as it rises; and as the air when the earth is heated, is rather near the ground than at some height from it, the place for equilibrium will, upon these two accounts, be brought much lower than otherwise it would be; as for example, to the height of about a mile, which will agree with phenomena.

In summer the two causes above-mentioned increasing, the Vapour raised by the heat 5, (whose place of equilibrium would be $5\frac{1}{2}$ miles high, if the Vapour, after it began to rise, was not condensed by cooling, and the air was denser close to the earth) will settle at the height of about $1\frac{1}{2}$, or two miles, which is also agreeable to phenomena.

Lastly, as the density and rarity of the Vapour is chiefly owing to its degree of heat, and in a small measure to the increased or diminished pressure of the circumambient air, when it is not confined; and the density and rarity of the air is chiefly owing to the increased or diminished pressure, by the accumulation or exhaustion of superior air, whilst heat and cold alter its density in much less proportion; the clouds made of the Vapours above-mentioned, instead of conforming themselves to the altered density of the ambient air, will rise when it is condensed, and sink when it is rarefied; and also rise or sink, when the pressure of the air is not altered, and its density very little changed, by their own dilatation, owing to heat and cold, as may be often observed by seeing them change their height considerably, whilst the barometer continues exactly at the same degree, and the liquor of the thermometer rises or falls very little, and sometimes not at all.

As for the manner how clouds are changed into rain, it has been hinted at the beginning of this article; but for farther satisfaction let the reader have recourse to Dr. Halley’s account of it in the *Philosoph. Transact.* N° 183, which Dr. Desaguliers says he has always found agreeable to the phenomena.

He adds, that since he had for brevity’s sake, only mentioned at what heights from the surface of the earth Vapours of different densities will come to an equilibrium, without giving a reason for settling the place of equilibrium, at whose heights he thought it proper here to give the method by which they may be found, viz.

As the Vapours will settle and rise where the air is of the same density with themselves, it is only required to find the density of the air at any distance from the earth at several heights of the barometer, which may be deduced from Dr. Halley’s two tables, *Philosoph. Transact.* N° 386. (the first shewing the altitudes to given heights of the mercury, and the second the heights of the mercury again at given altitudes,) and knowing the degree of heat by the thermometer, because the density of the Vapour depends upon the degree of heat of the season, provided that proper allowances be made for the great rarefaction of the air near the earth in hot and dry weather, and the condensation of the Vapours in their rise, by reason of the air being colder at a little height above the earth than just at the surface of it.

The quantity of Vapour raised from the sea by the warmth of the sun, is far greater than one would imagine. Dr. Halley has attempted to estimate it.

In an experiment made with that view, and described in the *Philosophical Transactions*, he found that a quantity of water no warmer than air in summer, lost in Vapour in the space of two hours, no less than $\frac{1}{17}$ part of an inch in depth: now for $\frac{1}{17}$ in two hours taking for the easier calculation, $\frac{1}{10}$ in the twelve hours that the sun is up each day, it will rise $\frac{1}{10}$ of an inch from the surface of the sea.

On this supposition, every ten square inches of the surface of the water yield in Vapour per diem, a cubic inch of water of four feet square, a gallon; a mile square, 6914 tons; a square degree supposed of 60 English

English miles, will evaporate 33 millions of tons; and if the Mediterranean Sea be estimated at 410 degrees long, and four broad, allowances being made for the places where it is broader, by those where it is narrower, there will be 160 square degrees of sea, and consequently the whole Mediterranean must lose in vapour in a summer's day, at least 5280 millions of tons.

In this quantity of Vapour, though very great, are only the remains of another cause, which cannot be reduced to rule; that is, the winds, whereby the surface of the water is licked up, sometimes faster than it exhales by the heat of the sun, as it is well known to those who have considered those drying winds.

For the manner wherein Vapours are raised, see more in BAROMETER, COLD, DEW, HEAT, and RAIN.

For the effect of Vapours in formation of springs, see SPRINGS, &c.

VARIEGATED signifies streaked or diversified with several colours; of which there are now a great variety of plants in the gardens of the curious, whose leaves are variegated with yellow or white. Those which are spotted with either of these colours in the middle of their leaves, are called blotched (in the gardeners term;) but those whose leaves are edged with these colours are called striped plants. Those plants whose leaves are blotched are generally subject to become plain, when planted in a good soil; or at least in the growing season, will have but a small appearance of the two colours; but those which have edged leaves, rarely become plain again, especially if the edging is broad, and goes quite through the leaves, though these do not appear so finely variegated in the growing season, as they do in the other parts of the year.

All the different sorts of Variegation in plants were at first accidental, being no more than a distemper in the plant, which being observed, has been cherished by impoverishing the soil in which they grow, by which method their stripes are rendered more lasting and beautiful. But whatever some persons have affirmed of striping plants by art, I could never observe it done by any, unless in woody shrubs and trees, which may be variegated by putting in a bud or graft taken from a variegated plant; where, although the buds should not grow, yet if they keep fresh but eight or ten days, they will many times communicate their gilded miasma to the sap of the trees into which they were budded; so that in a short time after, it has appeared very visible in the next adjoining leaves, and has been afterwards spread over the greatest part of the tree; but in such plants as are herbaceous, where this operation cannot be performed, there is no way yet ascertained whereby this striping can be effected by art.

In some sorts of plants this distemper is often communicated to the seeds, so that from the seeds gathered from variegated plants, there will constantly be some variegated plants produced; as in the striped Wing Pea, the greater Maple, &c. therefore these may be constantly propagated that way.

That this striping proceeds from the weakness of plants is very evident, since it is always observed, that whenever plants alter thus in the colour of their leaves, they do not grow so large as before, nor are they so capable to endure the cold; so that many sorts of plants which are hardy enough to endure the cold of our climate in the open air when in their natural verdure, require to be sheltered in the winter after they are become variegated, and are seldom of so long continuance; which is a plain proof that it is a distemper in the plants, since whenever they become vigorous, this striping is either rendered less visible, or entirely thrown off; especially (as was before observed) if the plants are only blotched, or if the edging be of a yellow colour, it is less apt to remain than when it is white; which is esteemed the most beautiful striping, and which (when once thoroughly established) is hardly ever to be got out of the plants again, so as to render the leaves entirely green.

Nay, such is the venom of this morbid matter, that it

not only tinges the leaves, but also the bark and fruit of trees are infected by it, as in the Orange, Pear, &c. whose bark and fruit are striped in the same manner as their leaves.

The different colours which appear in flowers also proceed from the same cause, though it is generally in a less degree in them than when the leaves and branches are infected: for the various colours which we see in the same flowers, are occasioned by the separation of the nutritive juice of plants, or from the alteration of their parts; whereby the smaller corpuscles, which are carried to the surfaces of the flower leaves, are of different forms, and thereby reflect the rays of light in different proportions. In order to understand this, it may not be improper to say something concerning the phenomenon of colours, as it hath been discovered by the late excellent philosopher Sir Isaac Newton.

1. Colour may be considered two ways: (1.) As a quality residing in the body that is said to be so and so coloured, or which doth modify the light after such a manner; or (2.) as more properly the light itself, which being so modified, shines upon the organ of sight, and produces that sensation we call colour.

2. Colour is defined to be a property inherent in light, whereby, according to the different sizes or magnitudes of its parts, it excites different vibrations in the fibres of the optic nerve, which being propagated to the sensorium, affects the mind with different sensations.

3. Again: colour may be defined a sensation of the soul, excited by the application of light to the retina of the eye; and different, as the light differs in the degree of its refrangibility, and the magnitude of its component parts.

4. According to the first definition, light is the subject of colour: according to the latter it is the agent.

5. So then light sometimes signifies that sensation occasioned in the mind, by the view of luminous bodies; sometimes that property in those bodies, whereby they are fitted to excite those sensations in us.

6. Various are the opinions of ancient and modern authors, and of the several sects of philosophers, with regard to the nature and origin of the phenomenon colour.

7. The peripatetics assert colours to be real qualities, and inherent in the coloured bodies; and suppose that light doth only discover them, but not any way affect their production.

8. Plato thought colour to be a kind of flame consisting of most minute particles, very congruous to the pores of the eye, and darted against it from the object.

9. Some moderns will have colour to be a kind of internal light of the more lucid parts of the object darkened, and consequently altered by the various mixtures of the less luminous parts.

10. Others, as did some of the ancient atomists, maintain colour not to be a lucid stream, but a corporeal effluvium issuing out of the coloured body.

11. Others account for all colours out of the various mixture of light and darkness; and the chemists will have it sometimes arise from the sulphur, and sometimes from the salt that is in bodies; and some also from the third hypostatic principle, i. e. mercury.

12. The most popular opinion is that of the followers of Aristotle, who maintain, that colour is a property inherent in the coloured body, and that it exists without any dependence on light.

13. The Cartesians, who made the sensation of light to be the impulse made on the eye by certain solid, but very minute globules, easily penetrating the pores of the air, and diaphanous bodies; these derive colour from the various proportion of the direct progress or motion of these globules to their circumrotation or motion round their own centres, by which means they are qualified to strike the optic nerve, after distinct and divers manners, and so produce the perception of divers colours.

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14. They own that as the coloured body is not immediately applied to the organ to occasion the sensation, as no body can affect the sense but by immediate contact, the coloured body does not excite the sensation of itself, or contribute any thing to it, otherwise than by moving some interposed medium, and by that the organ of sight.

15. They add, that as it is found that bodies do not affect the sense in the dark, and that light only occasions the sensation of colour, by moving the organ; and that coloured bodies are no farther concerned than in reflecting the light in a certain modification; the difference in colours, according to them, arises in a difference in the texture of their parts, by which they are disposed to reflect their light with this or that modification.

16. Dr. Hook, in his *Micographia* says, The phantasm of colours is caused by the sensation of the oblique or uneven pulse of light, and that this is capable of no more varieties than two, which arise from the two sides of the oblique pulse; so that there are in reality but two simple colours, yellow and blue; from the mixture of which, and a due proportion of black and white (that is, darkness and light) all colours may be produced.

17. But this phenomenon of nature and colour, having long perplexed philosophers to account for the discoveries relating thereto, the incomparable Sir Isaac Newton found by two experiments on prisms, that there is a great deformity in the rays of light, and that hereby the origin of colours may be unfolded. The doctrine of colours therefore, according to his notion and experiments, are contained in the following propositions:

1. That light consists of an infinite number of rays, right lined and parallel, but of different degrees of refrangibility, when meeting with a different medium.

2. Each ray, according to its degree of refrangibility, when so refracted, appears to the eye of a different colour.

3. The least frangible rays appear of a deep scarlet colour; the most refrangible appear of a Violet blue; the intermediate proceeding from scarlet to yellowish, then to light green, and so to blue.

4. The colours arising from the different degrees of refrangibility of light are not only the more noted colours of red, yellow, green and blue, but also all the intermediate colours of red to yellow, of yellow to green, &c.

5. Whiteness, (such as the sun's light appears,) containing all those degrees of refrangibility, is consequently made up of all the above-mentioned colours.

6. Simple or homogeneous colours, are such as are produced by homogeneous lights or rays, which have the same degree of refrangibility; and mixed colours are such as are produced by rays of different refrangibility.

7. Rays of the same refrangibility produce the same colour; which colour is not alterable by repeated refractions, but only made strong or faint, as the rays are united or scattered.

8. All bodies appear of this or that colour, according as their surfaces are adapted to reflect only the rays of such a colour: or at least in more plenty than the rest.

But to explain these things farther:

It is found by experience, that rays or beams of light are composed of particles very heterogeneous or dissimilar to each other; i. e. some of them, as it is highly probable, are larger, and others less; for a ray of light, being received on a refracting surface in a dark place, is not wholly refracted, but split as it were, and diffused into several little rays; some of which are refracted to the extreme points, and others to the intermediate points; i. e. those particles of the light, which are most minute, are diverted the most easily and most considerably of all others, by the action of the refracting surface, out of their rectilinear course;

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and the rest, as each exceeds another in magnitude, so it is turned out of its right line with much difficulty, and less considerably.

Now each ray of light, as it differs from another in its degree of refrangibility, so likewise it differs from it in colour. This is warranted by numerous experiments.

Those particles which are more refracted, are found to constitute a ray of a Violet colour; i. e. in all probability, the most minute particles of light, thus separately impelled, excite the shortest vibration in the retina, which are thence propagated by the solid fibres of the optic nerve into the brain, there to excite the sensation of Violet colour, as being the most dusky and languid of all colours.

Again: those particles which are the most refracted constitute a radiolus, or little ray, of a red colour; i. e. the largest particles of light excite the longest vibrations in the retina, so as to excite the sensation of red colour, the brightest and most vivid of all colours. It is remarkable, that in the growing of plants, the same plants do from time to time, alter and change their colours as the vessels which are in their young shoots grow larger. The leaves are of a faint yellow when they are in their smaller state, but they become of a bright green, or sometimes red, when they are in their middle state; but when their vessels are enlarged to their full growth, they become of a dark green, and then change to a feuilemort colour towards autumn, from the ripening of their juices; from thence to putrefaction, which resolves itself again into earth, its first principle.

VASCULIFEROUS PLANTS are such whose seeds are contained in vessels, which are sometimes divided; and these have always a monopetalous flower, either uniform or difform.

VASES: A Vase is a sort of a flower-pot to set in a garden.

VEGETABLE, a term applied to all plants, considered as capable of growth; i. e. to all natural bodies, which have parts organically formed for generation and accretion, but not for sensation.

Dr. Boerhaave defines a Vegetable to be a body generated of the earth, to which it adheres, and is connected by parts called roots, through which it receives the matter of its nourishment and increase, and consists of juices and vessels, sensibly distinct from each other; or a Vegetable is an organical body, composed of vessels and juices every where distinguishable from each other, to which the roots grow, or parts by which it adheres to some other body, from which it derives the matter of its life and growth.

This definition of a Vegetable is very scientific, and furnishes us with a just and adequate idea of it; for by its consisting of vessels and juices, it is distinguished from a fossil; and by its adhering to another body, and deriving its nourishment therefrom, it is distinguished from an animal.

He defines a Vegetable an organical body, because it consists of different parts, which jointly concur to the exercise of the same function.

The definition of its adhering by some of its parts to another body is very proper; for we know of no plant that is so absolutely vague and fluctuating, but has still a body it adheres to, though that body may be various, e. g. earth, as in our common plants; stone, as in rock plants; water, as in sea plants; air, as in some mucilages.

As to those few plants that appear to float with the water, their manner of growth is somewhat anomalous. Monsieur Tournefort has shewn, That all plants do not arise strictly from seeds; but that some, instead of semen, deposit or let fall a drop of juice, which sinking in the water by its gravity, reaches the bottom, or some rock, &c. in its way, to which it sticks, strikes root, and shoots into branches: such is the origin of coral.

To which may be added, That a root of a plant may have any situation at pleasure, with respect to the body

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body thereof; nor needs it be either lowest or highest, &c. Accordingly in Coral, Mosses, Funguses, &c. the root is frequently uppermost, and its growth downwards.

VEGETABLE STATICS signifies the weight or gravity, and the motion of the juices, in vegetable bodies.

VEGETATION is the act whereby plants receive nourishment, and grow; the word is derived from the Latin, *vegeto*, to quicken, to refresh, to make lively and strong; and signifies the way of growth, or increase of bulk, parts, and dimensions proper to all trees, shrubs, herbs, plants, minerals, &c.

To understand the process of nature in the business of Vegetation, it is to be considered, that there is in vegetables a principle of life, and this is differently seated; there are some who suppose it is seated exactly between the trunk and the root, which they say is observed to be the place of its position, in all or most of the seminiferous tribe; but if the Oak and some other trees be included in that general title, and their bodies be cut down near that place, it is odds if they ever shoot again, or at least to any purpose.

In some trees it is only the roots which vegetate, so that let them be cut into as many pieces as reasonably may be, if these pieces are but planted in the ground, they quickly grow, as is seen in the Elm, &c. and in many other trees.

In some it is seated both in the roots, and all over the trunk and branches, as in the vineous or Willow kinds, which, if they be cut into a thousand pieces, it is scarce possible to destroy or kill them, unless they are stripped of both their barks; for if you plant them in the earth but the length of three or four inches, either the roots or branches will certainly grow again.

In some it is found entirely in the body, branches, or leaves, and of this kind are many of the exotics, which being of a succulent nature, if the trunk or branches, or the leaves and stems, be put into the ground, they will strike root immediately, and grow, as in the Cereuses, Ficoides, Sedums, &c. nay, so strong is the principle of life in this kind of plants, that if they be hung a considerable time in the air without any earth, water, &c. they will maintain their natural verdure, and also this principle of life, admirably, by their succulent quality.

The use of this principle of life is accounted to be for the concoction of the indigested salts, which ascend through the roots, where they are supposed to assimilate the nature of the tree they are helping to form, though perhaps the root may likewise assist in the work.

These things being presupposed, in the spring of the year, as soon as the sun begins to warm the earth, and the rains melt the latent salts, the whole work of Vegetation is set on foot; then the emulgent fibres seek for food, which has been prepared as aforesaid.

It is very rational to suppose that a great part of the roots are formed under ground during the winter season, because in all lands there is always an innate heat, which seems to be a natural vital quality, or nitrous fermentation.

The roots, by seeking out and assuming those nitrous salts, are immediately (by the course of nature, and the attractive virtue of the sun) drawn upwards to the vital principle, and, after concoction, ascend still higher into the stem, and break out first in the buds, the shelly and tenderest part of the whole machine, and afterwards diffuse themselves into the leaves, flowers, fruits, &c. which lie enveloped therein, according to their natural frames, &c.

There are some who suppose that subterraneous fires are concerned in the work of Vegetation, or the growth of plants, yet as, upon the best observation that can be made, none can pretend to have discovered any heat or fumigation to issue from the bowels of the earth, adequate to the meanest artificial fire, it is plain that the sun is the principle, and so may be

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called the father of Vegetation, and the earth the mother, the rain and air being necessary co-efficients in this surprising work.

It is apparent, by the use of microscopes, that plants consist of different parts, vessels, &c. analogous to those of animals, and each kind of vessel is supposed to be the vehicle of a different humour, or juice, secreted from the matter of the sap, which is considered as the blood, or common fund of them all.

Dr. Grew farther explains this, by saying, That all kinds of vegetable principles are at the first received together in a plant, and are separated afterwards, i. e. they are filtered some from others in very different proportions and conjunctions by the several parts, so every part is the receptacle of a liquor, become peculiar, not by any transformation, but only by the percolation of parts out of the common mass or stock of sap, and those that are superfluous in any plant, are discharged back by perspiration.

The same author assigns the offices of the several vessels: he calls those vessels lympheducts, which are placed on the inner verge of the bark, and these, he supposes, are appointed for the conveyance of the most aqueous or watery liquor.

Those vessels that are in the middle of the plant, he calls lactiferous or resiniferous; these he takes to be the principle viscera of plants; and that as the viscera of animals are but conglomerated vessels, the viscera of plants are drawn out in length.

It is also remarkable in many cases, That the multitude and largeness of the vessels produce a sweet and vinous sap, and the fewness and smallness of the vessels produce an oily and aromatic sap.

It seems necessary to the nutrition of plants, as well as animals, that there be a concurrence of two specifically distant fluids; and a certain author maintains, That there is an intermixture of two such humours in every part of a tree, every part of sap being impregnated with other tinctures, and continually filtered from fibres of one kind to those of another, and from this mixture many of the phenomena of the ripening, odour, &c. are accounted for.

With regard particularly to the odour in plants, Dr. Grew is of opinion, that they chiefly proceed from the air-vessels that are in the wood, not but that the other parts also yield their smells, which is most plain to be perceived in plants that are fresh, undried, and unbruised; for he says that the air, bringing along with it a tincture from the root, and from the several organical parts, and at last entering the concave of the air-vessels, it consists there.

Others say, That it cannot be denied but the effluvia, which can be admitted into the wood-vessels, may give a smell to the wood; but however, as that vapour passes through the vessels which have a different structure, so as to alter the form of its parts, so in every one of its changes, it will yield a smell different from the rest. The smell of the wood will differ from that of the bark, the juices in the one being more essential than the other; but yet both, being bruised and mixed together, yield a scent different from either of them singly, and likewise the leaves give a scent that is different from either of the former, and so also do the flowers from that in the leaves, and also the fruit from that in the flowers.

Dr. Grew is of opinion that the chief governing principle in the juice of plants, is the saline, which saline principle, he says, must be understood as a generic term, under which divers species are comprehended. The vegetable salts seem to be four, viz. the nitrous and the acid, alkaline and marine, and of these the nitrous salts seem to be assigned by nature chiefly for the growth of plants.

The curious Malpighius has very accurately delivered the process of nature in the Vegetation of plants to the effect following.

The ovum or seed of the plant, being excluded out of the ovary (which is called the pod or husk) and requiring farther fostering and brooding, is committed to

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to the earth. The earth, like a kind mother, having received it into her bosom, does not only perform the office of incubation, by her own warm vapours and exhalations, in conjunction with the heat of the sun, but gradually supplies what the seed requires to its farther growth, as abounding every where with canals and sinuses, in which the dew and rain water, impregnated with fertile salts, glide like the chyle and blood in the arteries, &c. of animals.

This moisture, meeting with new-deposited seed, is percolated or strained through the pores or pipes of the outer rind or husk, answering to the secundines of fœtuses, on the inside whereof lie one more, commonly two, thick feminal leaves corresponding to the placenta in women, and the cotyledons in brutes.

The seed-leaves consist of a great number of little vesiculæ or bladders, with a tube corresponding to the navel-strings in animals.

The moisture of the earth, strained through the rind of the seed, is received into these vesiculæ, which causes a slight fermentation with the proper juice before contained therein.

This fermented liquor is conveyed by the umbilical vessel to the trunk of the little plant, and to the gem or bud which is contiguous to it, upon which a Vegetation and increase of the plant succeed.

This procedure in the Vegetation of plants, the afore-said author exemplifies in a grain of Wheat as follows: The first day the grain is sown, it grows a little turgid, and the secundine or husk gapes a little in several places; and the body of the plant, being continued by the umbilical vessel to a conglobated leaf (which is called the pulp or flesh of the seed, and is what constitutes the flour) swells, by which means, not only the gem or sprout (which is to be the future stem) opens and increases, but the roots begin to bunch out, whence the placenta or seed-leaf, becoming loose, gapes.

The second day, the secundine or husk, being broken through the stem or top of the future straw, appears on the outside thereof, and grows upward by degrees. In the mean time, the seed-leaf, guarding the roots, becomes turgid with its visculæ, and puts forth a white down, and the leaf being pulled away, you see the roots of the plant bare, the future bud, leaves, and the rest of the stalk lying still hid. Between the roots and the ascending stem, the trunk of the plant is knit by the navel-knot to the flower-leaf, which is very moist, though it still retains its white colour, and its natural taste.

The third day the pulp of the conglobated or round leaf becomes turgid with the juice it has received from the earth fermenting with its own.

Thus the plant increases in bigness, and in its bud or stem becomes taller, and from whitish turns greenish. The lateral roots also break forth greenish and pyramidal, from the gaping sheaf, which adheres closely to the plant, and the lower roots grow longer and hairy, with many fibres growing out of the same.

Indeed, there are hairy fibres hanging all along on all the roots, except on the tops, and these fibres are seen to wind about the saline particles of the soil, or little lumps of earth, &c. like Ivy, whence they grow curled. About the lateral roots there now break out two other little ones.

The fourth day the stem, mounting upwards, makes a right angle with the feminal leaf. The last roots put forth more, and the other three, growing larger, are clothed with more hairs, which straitly embrace the lumps of earth, and where they meet with any vacuity, unite in a kind of net-work. The conglobate or flower-leaf, is now softer, and, when bruised, yields a white sweetish juice, like Barley cream. By stripping it off, the root and stem of the plant are plainly seen, with the intermediate navel-knot, whose outer part is solid like a bark, and in the inner more soft and medullary.

The fifth day the stalk, still rising, puts forth a permanent or stable leaf, which is green and folded. The roots grow longer, and there appears a new tumour

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of a future root; the outer or sheath is loosened, and the seed-leaf left begins to fade.

The sixth day the stable-leaf being loosened, the plant mounts upwards, the sheaf still cleaving round it like a bark. The seed-leaf is now seen sinuous or wrinkled, and faded; and this being freed or cut from the secundine, the flesh or pericarpium is found of a different texture, the outer part, whereby the outside of the seed or grain is heaped up, being more solid, but the inside viscular, and full of humour, especially that part next the navel-knot. All the leaves being pulled off, the roots torn, and the flower-leaf removed, the trunk appears, wherein, not far from the roots, the navel-knot bunches out, which is solid, and hard cut; above there is a mark of the sheath-leaf, which was pulled off, and underneath, as in an arm-pit, the gem is often hid; the hind part of the plant shews the breaking forth of the roots likewise, with the faded placenta, &c.

After the eleventh day the seed-leaf, as yet sticking to the plant, is crumpled, and almost corrupted; within it is hollow, and about the secundine, the mucus and white substance of the seed, being continued to the navel-knot forms a cavity; all the roots, becoming longer, put forth new branches out of their sides. The second leaf withers, and its vesicles are emptied; the internodes or spaces between the knots grow longer, new gems appear, and the middle root grows several inches longer.

After a month, the roots and stalk being grown much longer, new buds break out at the first knot, and little tumours bunch out, which, at length, break out into roots.

As to the vegetable matter, or the food where the plants grow, there is some doubt; it hath been a general opinion among almost all the modern naturalists, That the Vegetation of plants, and even of minerals too, is principally owing to water, which not only serves as a vehicle to convey to them the fine rich earth, &c. proper for their nourishment, but being transmuted into the body of the plant, affords the greatest part, if not all the matter with which they are nourished, and by which they grow and increase in bigness. This opinion is countenanced by very great names, particularly by the ingenious Dr. Woodward, who, in order to ascertain this point, made the following experiments:

In the first place, he carefully examined all sorts of water, and found that the clearest fine spring water, which he could any where meet with, exhibited even to the naked eye great numbers of exceeding small terrestrial particles, and that all other crasser waters had these in yet much greater quantity, and also, that they were of a larger bulk.

He found this terrestrial matter contained in all water to be of two kinds, the one properly a vegetable matter, but consisting of very different particles, some of which are very proper for the nourishment of some kinds of plants, others for different sorts, &c. The other kind of earthy matter he found to be purely of a mineral nature, and this also was of very various and different kinds.

The former sort of vegetable earthy matter abounds plentifully in all waters, but for the mineral, it is found mostly in spring water, next to that, in river water, and least of all, in rain water, though even there also it is to be found plentifully.

This fact, he says, any one may discover, by only keeping water for a competent time without stirring it, in a clear glass phial, closely stopped to keep out dust, &c. for then he will observe that these very small terrestrial particles, which before were scarcely visible singly, will now combine together into large and more conspicuous masses, which, by degrees, will join together, and form clouds, as it were, in the water, which will grow daily more and more opacous and thick by the continual accession of new matter; and if the earthy matter in the water be chiefly of the vegetable kind, it will turn the water green, the usual colour of vegetables, and this will grow deeper

deeper and deeper coloured, but will not precipitate to the bottom of the glasses, as the mineral water will, if there be any considerable quantity, by reason of its much greater specific gravity. On the whole therefore he concludes very justly, That there is in all water a considerable quantity of the earthy matter. And in order to determine whether the Vegetation of plants was chiefly owing to bare water or not, rather than to the terrestrial matter therein contained, he made with very great accuracy and care several experiments. Which experiments, because they were done with an uncommon care and exactness, are a sufficient number of them, and are followed by very ingenious reflections, serving to explicate many difficulties of philosophy, and to set the whole affair of Vegetation in a very good light, I shall give the register as follows: Anno Dom. 1691, he chose several glass phials, that were all, as near as possible, of the same shape and bigness. After he had put what water he thought fit into every one of them, and taken an account of the weight of it, he strained and tied over the orifice of each phial a piece of parchment, having holes in the middle of it large enough to admit the stem of the plant he designed to set into the phial, without confining or streightening it so as to impede its growth. His intention in this was to prevent the inclosed water from evaporating or ascending any other way than only through the plant to be set therein. Then he made choice of several sprigs of Mint and

other plants, that were, as near as he could possibly judge alike found, fresh, and lively. Having taken the weight of each, he placed them in a phial, ordered as above, and as the plant imbibed and drew off the water, he took care to add more of the same from time to time, keeping an account of the weight of all he added. Each of the glasses were, for better distinction, and the more easy keeping a register of all the circumstances, noted with a different mark or letter, as A, B, C. &c. and all set in a row in the same window, in such a manner that all might partake alike of air, light, and sun. Then they continued from July the 20th to October the 5th, which is just 77 days, when he took them out, weighed the water in each phial, and the plant likewise, adding to its weight that of all the leaves that had fallen off, during the time it had stood thus, and lastly he computed how much each plant had gained, and how much water was spent upon it.

The particulars are as follow:

The plant weighed, when put in, July the 20th, just 27 grains; when taken out, October the 5th, 42 grains, so that in the space of 77 days it had gained in weight 15 grains. The whole quantity of water, expended during the 77 days, amounts to 2558 grains. Consequently the weight of the water had taken up $170\frac{2}{3}$ times the grains as much as the plant had gained in weight.

This will be made plainer by the following TABLE.

Weight of the plant when first put into water.	Weight of the plant when taken out of the water.	Weight gained by the plant during the 77 days.	Weight of the water expended upon the plant.	Proportion of the increase of the plant to the expence of the water.
A				
27 grains.	42 grains.	15 grains.	Spring Water. 2558 grains.	as 1 to $170\frac{2}{3}$.
B				
$28\frac{1}{4}$ grains.	$45\frac{3}{4}$ grains.	$17\frac{1}{2}$ grains.	Rain water. 3004 grains.	as 1 to $171\frac{2}{3}$.
C				
28 grains.	54 grains.	26 grains.	Thames water. 2493 grains.	as 1 to $95\frac{2}{3}$.
D				
49 grains.	106 grains.	57 grains.	Spring water. 3708 grains.	as 1 to $65\frac{3}{7}$.
E				
98 grains.	$101\frac{1}{2}$ grains.	$3\frac{1}{2}$ grains.	Ger. spring water. 2501 grains.	as 1 to $714\frac{4}{7}$.

The specimen D had several buds upon it, when first set into the water; these, in some days, became fair flowers, which were at length succeeded by berries. Several other plants were tried, which did not thrive in water, nor succeed any better than the Cataputia foregoing. The phials F and G were filled, the former with rain, and the other with spring water, at the same time as those above-mentioned were, and stood as long as they did, but they had neither of them any plant, the design of which was in order to learn, whether any water exhaled out of the glasses, otherwise than through the bodies of the plants. The orifices of these two glasses were covered with parchment, each piece of it being perforated with an

hole of the same bigness with those of the phials above. In these was suspended a bit of stick about the thickness of the stem of one of the aforesaid plants, but not reaching down to the surface of the inclosed water, that the water in these might not have more scope to evaporate than that in the other phials. Thus they stood the whole 77 days with the rest, when, upon examination, none of the water was found to be wasted, or gone off; though he observed both in these and the rest, especially after very hot weather, small drops of water, not unlike to dew, adhering to the insides of the glasses, i. e. that part of them that was above the surface of the inclosed water.

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The water in these two glasses that had no plants in them, at the end of the experiment exhibited a larger quantity of terrestrial matter, than that in any of those that had the plants in them did.

The sediment in the bottom of the phials was greater, and the nubeculæ diffused through the body of the water thicker, and of that which was in the others, some of it proceeded from certain small leaves that had fallen from that part of the stem of the plants that was within the water, wherein they rotted and dissolved.

The terrestrial matter in the rain water was finer than that of the spring water.

Experiments, Anno 1692.

The glasses made use of in this were of the same sort with those of the former experiment, and covered over with parchment after the same manner.

The plants here were all Spear Mint, the most kindly, fresh, sprightly shoots he could chuse. The water and plants were weighed, as above, and the phials set in a line in a south window, where they stood from June the 2d to July the 28th, which was just 56 days.

The plant H was all along a very kindly one, and ran up about two feet in height. It had shot but one considerable collateral branch, but had sent forth many and long roots, from which sprung very numerous, though small and short lesser fibres. The lesser roots came out of the larger on two opposite sides for the most part, so that each root, with its fibrillæ, appears not unlike a small feather; to these fibrillæ adhered

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pretty much terrestrial matter. In the water, which was at last thick and turbid, was a green substance, resembling a fine thin conserva.

The plant I was as kindly as the former, but had shot no collateral branches. Its roots, the waters, and the green substance, all much as in the former.

The plant K, though it had the misfortune to be annoyed with very small insects that happened to fix upon it, yet had shot very considerable collateral branches, and at least as many roots as either H or I, which had a much greater quantity of terrestrial matter adhering to the extremities of them. The same green substance here that was in the two preceding.

The plant L was far more flourishing than any of the preceding, had several considerable collateral branches, and very numerous roots, to which terrestrial matter adhered very copiously.

The earth in both these glasses were very sensibly and considerably wasted, and less than when at first put in. The same sort of green substance here as in those above.

The plant M was pretty kindly, had two small collateral branches, and several shoots, tho' not so many as those in H or I, but as much terrestrial matter adhering to them as those had. The water was pretty thick, having very numerous small terrestrial particles swimming in it, and some sediment at the bottom of the glass. This glass had none of the green matter above-mentioned in it.

The plant N was very lively, and had sent out six collateral branches, and many roots, but the water was very turbid, and as high coloured as ordinary beer.

Weight of the plant when first set in water.	Weight of the plant when taken out of the water.	Weight gained by the plant when it had stood 56 days.	What of the water is expended upon the plant.	Proportion of the increase of the plant to the expence of the water.
H				
<i>Hyde-Park conduit water alone.</i>				
127 grains.	255 grains.	128 grains.	14190 grains.	as 1 to 110 $\frac{110}{111}$.
I				
<i>The same water alone.</i>				
110 grains.	249 grains.	139 grains.	13140 grains.	as 1 to 94 $\frac{74}{139}$.
K				
<i>The same water, with an ounce and a half of common garden earth dissolved in it.</i>				
76 grains.	244 grains.	168 grains.	10731 grains.	as 1 to 63 $\frac{147}{168}$.
L				
<i>Hyde-Park water, with the same quantity of garden mould as the former.</i>				
92 grains.	376 grains.	284 grains.	14950 grains.	as 1 to 52 $\frac{152}{284}$.
M				
<i>Hyde-Park water distilled with a gentle still.</i>				
114 grains.	155 grains.	41 grains.	8803 grains.	as 1 to 214 $\frac{29}{41}$.
N				
<i>The residue of the water which remained in the still after that in M was distilled off.</i>				
81 grains.	175 grains.	94 grains.	4344 grains.	as 1 to 46 $\frac{39}{94}$.

The glass O had also Hyde-Park conduit water, in which was dissolved a drachm of nitre. The Mint set in this suddenly began to wither and decay, and died in a few days, as likewise did two more sprigs that were set in it successively. In another glass he dissolved an ounce of good garden mould, and a drachm of nitre, and in a third, half an ounce of wood ashes, and a drachm of nitre, but the plants in

these succeeded no better than the former. In other glasses he dissolved several other sorts of earth, clay, marles, and variety of manures, &c. and he set Mint in distilled Mint water, and made other experiments of several kinds, in order to get a light and information what hastened or retarded, promoted or impeded Vegetation.

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The glass P, Hyde-Park conduit water: in this he fixed a glass tube ten inches long, the bore one sixth of an inch diameter, filled with very fine and white sand, which he kept from falling down out of the tube into the phial, by tying a fine piece of silk over that end of the tube that was downwards. Upon immersion of the lower end of it into the water, this, by little and little, ascended quite up to the orifice of the tube, and yet in all the 56 days that it stood thus, a very inconsiderable quantity of water had gone off, viz. scarcely 20 grains, though the sand continued moist up to the top till the very last.

The water had imparted a green tincture to the sand quite to the very top of the tube, and in the phial it had precipitated a greenish sediment mixed with black. To the bottom and sides of the tube, as far as it was immersed in the water, adhered pretty much of the green substance described above.

Other like tubes he filled with cotton, lint, pith of Elder, and several other porous vegetable substances, setting some of them in clear water, others in water tinged with Saffron, Cochineal, &c. and several other trials were made, in order to give a mechanical representation of the motion and distribution of the juices in plants, and of some other phenomena observable in Vegetation.

Several plants being also set in the phials Q, R, S, &c. ordered in like manner as those above in October, and the following colder months those thrive not near so much; nor did the water ascend nigh the quantity it did in the hotter seasons, in which the before cited trials were made.

The result of all which experiments he gives us in the following observations and reflections:

I. *In plants of the same kind, the less they are in bulk, the smaller quantity of the fluid mass in which they are set is drawn off; the consumption where the mass is of equal thickness, being pretty nearly proportioned to the bulk of the plant.*

In effect, the water seems to ascend up the vessels of the plants, in much the same manner as up a filtre; and it is not to be wondered at, that the larger filtre should draw off more water than the smaller; or that a plant that hath more or larger vessels, should take up a greater part of the fluid in which it is set, than one that has fewer can. Nor is it thus noted as a thing very considerable in itself, but chiefly with regard to what follows:

II. *Much the greater part of the fluid mass, thus drawn off, and conveyed into the plant, does not settle or abide there, but passes through their pores, and exhales up into the atmosphere.*

That the water in these experiments, ascended only through the vessels of the plants is certain, since some glasses, which had no plants in them, though disposed in the like manner as the rest, did remain, at the end of the experiment, as at first, and without any diminution of water, and that the greatest part of it flies off from the plant into the atmosphere, is as certain.

The least proportion of the water expended was to the augment of the plant, as 46 or 50 to 1; and in some 100, 200 in 1, as 700 to 1.

Thus so continual an emission of water, in so great plenty, from the parts of the plant, affords a manifest reason, why countries that abound with trees, and the larger vegetables especially, should be very obnoxious to damp, great humidity in the air, and more frequent rains, than others that are more open and free.

The great moisture of the air was a great inconvenience and annoyance to those who first settled in America, which at that time was overgrown with woods and groves; but as these were burnt down and destroyed, to make way for habitations, and the culture

of the earth, the air mending, changed into a temperature more serene and dry than before.

Nor does this humidity go off pure and alone, but usually carries with it many parts of the same nature with those whereof the plant consists; the crasser indeed are not so easily borne up into the atmosphere, but are usually deposited on the surface of the leaves, flowers, and other parts of the plants; whence proceed our mannas, our honeys, and other gummy exsudations of vegetables; but the finer and lighter parts are with greater ease sent up into the atmosphere, thence they are conveyed to our organs of smelling, by the air we draw in respiration, and are pleasant or offensive, beneficent or injurious to us, according to the nature of the plants from whence they arise: and since these owe their rise to the water that ascends out of the earth through the bodies of plants, we cannot be far to seek for the cause why they are more numerous in the air, and a greater quantity of odours is found exhaling from vegetables in warm humid seasons, than in any other.

III. *A greater part of the terrestrial matter that is mixed with water, ascends up into the plant as well as the water.*

There was much more terrestrial matter at the end of the experiment, in the water of the glasses that had no plants in them, than in those that had plants. The garden mould dissolved in some of the glasses was considerably diminished, and carried off; nay, the terrestrial and vegetable matter was borne up in the tubes filled with sand, cotton, &c. in that quantity as to be evident even to sense; and the bodies in the cavities of the other tubes, that had their lower ends immersed in water, wherein Saffron, Cochineal, &c. had been infused, were tinged with yellow, purple, &c. To look abroad a little towards our shores and parts within the verge of the sea, these will present us with a large scene of plants, that, along with the vegetables, take up more mineral matter also in great abundance; such as our Sea Purslain, several sorts of Algas, of Samphires, and other marine plants; those contain common sea salts, which are the same as the fossil, in such plenty, as not only plainly to be distinguished in the palate, but may be drawn out of them in a considerable quantity; nay some affirm there are plants found, that will yield nitre and other mineral salts.

The vegetable matter, being very fine and light, is surprisingly apt and disposed to attend water in all its motions, and follow into each of its recesses, as appears not only from the instances above alledged, but many others percolate it with all the care imaginable, filtre it with ever so many filtrations, yet some terrestrial matter will remain.

Dr. Woodward has filtered water thro' several sheets of thick paper, and after that through very close fine cloth, twelve times double, and this over and over; and yet a considerable quantity of this matter discovered itself in the water after all.

Now if it thus passes interstices that are so very small and fine along with the water, it is less strange it should attend it in its passage through the ducts and passages of plants. It is true filtering and distilling of water interrupts, and makes it quit some of the earthy matter it was before impregnated withal; but then that which continues with the water after this, is fine and light, and such consequently, as is in a peculiar manner fit for the growth and nourishment of vegetables.

And this is the case of rain water. The quantity of terrestrial matter it bears up into the atmosphere is not great; but what it doth bear up is chiefly of that light kind, or vegetable matter, and that too perfectly dissolved, and reduced to single corpuscles, all fit to enter the tubes and vessels of plants; on which account it is, that this water is so very fertile and prolific.

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The reason why all the terrestrial matter mixed with the water does not ascend into that, is, that the mineral matter makes a great deal of it, which is not only gross and ponderous, but scabrous and inflexible, and so not disposed to enter the pores of the roots; besides, a great many of the simple vegetable particles do by degrees unite and form small clods, or molecules, which stick to the extremities of the roots of those plants, and others of them entangled in a looser manner for the nubeculæ, or green bodies, so commonly observed in stagnant water; these, when thus conjoined, are too big to enter the pores, or ascend up the vessels of plants, which singly they might have done.

Hence it is, that in agriculture, be the earth never so rich, good, and fit for the production of Corn, or other vegetables, little will come of it, unless the particles be separated and loose; and it is on this account such pains are bestowed in the digging, tilling, ploughing, fallowing, harrowing, and breaking the clodded lumps of earth; and it is the same way that sea salt, nitre, and other salts promote Vegetation.

Some authors imagine nitre essential to plants, and that nothing in the vegetable kingdom is transacted without it; but Dr. Woodward says, by all the trials he has been able to make, the thing seems to him quite otherwise; and when contiguous to the plant, nitre rather destroys than nourishes it. This I have myself found to be true, for by scattering some nitre round the roots of three or four plants, it killed them in a few days.

But nitre and other salts certainly loosen the earth, and separate the concreted parts of it, by that means fitting and disposing them to be assumed by the water, and carried up into the feed or plant for its formation and increase.

It is evident to observation, how apt all sorts of salts are to be wrought upon by moisture, how easily they run with it; and when these are drawn off, and have deserted the lumps with which they are incorporated, they must moulder immediately, and fall asunder in course.

The hardest stone that is to be met with, if it happens (as it frequently does) to have any salt intermixed with the sand of which it consists, upon its being exposed in a humid air, in a short time dissolves and crumbles all to pieces; and much more will clodded earth or clay, which is not of so compact and solid a constitution.

Lime likewise is in the same way serviceable in this affair. The husbandmen say, it does not fatten, but only mellows the ground; by which they mean, it doth not contain any thing in itself, that is of the same nature with the vegetable mould, or afford any matter fit for the formation of plants, but merely soften and relaxes the earth; by that means rendering it more capable of entering the seeds and vegetables set in it, in order to their nourishment, than otherwise it would have been.

The properties of lime are well known, and how apt it is to be put into a ferment and commotion by water; nor can such commotion ever happen, when lime is mixed with earth, however hard and clodded it may be, without opening and loosening it.

IV. *The plant is more or less nourished, in proportion as the water in which it stands, contains a greater or smaller quantity of proper terrestrial matter in it.*

The truth of this proposition is discernible through the whole process of the Doctor's experiments. The Mint in one of the glasses was of much the same bulk and weight with that of two or three others; but the water in which the first was, being river water, which was apparently more copiously stored with terrestrial matter than the spring or rain water, in which the other stood, occasioned it to arrive at almost double the bulk that either of them had, and with less expence of water too.

So likewise the Mint in another glass, in the water of which was dissolved a small quantity of good garden mould, though it had the disadvantage to be less when first set, than either of the Mints in the two other glasses had, the water in which was the very same as the first, only none of the earth mixed with it; yet in a short time the plant not only overtook, but much outstripped the other.

The reason why the proportion of the increase of the plant was limited to the quantity of proper terrestrial matter in the water, is, that all, even vegetable matter, is not proper for the nourishment of every plant; nor do there want good indications, that every kind requires a peculiar and specific matter for its formation and nourishment, nay, each part of the same vegetable; and that there are very many and different ingredients, to go to the composition of the same individual plant.

If therefore the soil wherein any vegetable or seed is planted, contains all or most of these ingredients, and those in due quantity, it will grow and thrive, otherwise it will not. If there be not as many sorts of corpuscles as are requisite for the construction of the main and more essential parts of the plant, it will not prosper at all. If there are these, and not in sufficient plenty, it will never arrive to its natural stature, or if any of the less necessary and essential corpuscles are wanting, there will be some failure in the plant. It will be defective in smell, taste, colour, and some other way.

Indeed it is inconceivable, how one uniform homogeneous matter, having its principles, or original parts, of the same substance, constitution, magnitude, figure, and gravity, should constitute bodies so unlike in all those respects, as vegetables of different kinds are, nay, even as the different parts of the same vegetable, that one should carry a resinous, another a milky, a third a yellow, and a fourth a red juice in its veins; that one affords a fragrant, another an offensive smell; one sweet to the taste, another acid, bitter, acerb, austere; that one should be nourishing, another poisonous; one purging, another astringent; and these all receive their nourishment from the same soil.

A Cataputia, *Tithymalus latifolius* Cataputia dicta, in one of the glasses afforded but a little increase, only $3\frac{1}{2}$ grains all the while, though 2501 grains of water were spent upon it; but this might possibly be owing not to the water's wanting matter fit for the nourishment of that particular plant, but from its being an improper medium for that to grow in. Too much of that liquor in some plants, may probably hurry the terrestrial matter through the vessels too fast for them to lay hold of it.

But a farther proof of this matter is, that the soil once proper for the production of some sort of vegetables, does not ever continue so, but in tract of time loses its property; and sooner in some lands, and later in others.

As for example: if Wheat be sown upon land proper for that grain, the first crop will succeed very well, and perhaps the second and third, as long as the ground is in heart, as the farmers call it; but in a few years it will produce no more, if sowed with that Corn; some other grain it may, as Barley; and after this has been sown so oft, that the land can bring no more of it, it may afterward yield some good Oats, and perhaps Peas after them.

At length it becomes barren; the vegetative matter that at first it abounded with, being reduced by the successive crops, and most of it borne off, each sort of grain takes out that peculiar matter that is proper for its own nourishment.

It may be brought to bear another series of the same vegetables, but not till it is supplied with another fund of matter of the like sort with what it first contained; either by the ground's lying fallow for some time, till the rain hath poured a fresh stock upon it, or by the manuring it.

That this supply is of the like sort is evident, by the several manures found best to promote the Vegetation;

tion, which are chiefly either of parts of vegetables, or of animals; of animals, which either derive their own nourishment immediately from vegetable bodies, or from other animals that do so; in particular, the blood, excrements, and urine of animals that do so; shaving of horns and hoofs, hair, feathers, calcined shells, lees of wine and beer, ashes of all sorts of vegetable bodies, leaves, straw, roots, and stubble, turned into earth by ploughing; or otherwise, to rot and dissolve there.

These are our best manures; and, being vegetable substances, when refunded back again into the earth, serve for the formation of other bodies.

But to apply this to gardens, where the trees, shrubs, and herbs, after their having continued in one station till they have derived thence the greatest part of the matter fit for their increase, will decay and degenerate, unless either fresh earth, or some fit matter be applied to them.

It is true they may maintain themselves there for some time, by sending forth roots farther and farther, to an extent all around, to fetch in more provision; but at last they must have a fresh supply brought to them, or they will decay.

All these instances argue a particular terrestrial matter, and not water, for the subject to which plants owe their increase; were it water only, there would be no need of manures, or changing the species; the rain falls in all places, in this field and in that, indifferently, on one side of an orchard or garden, as well as the other; nor could there be any reason why a tract of land should yield Wheat one year and not the next, since the rain showers down all alike upon the earth.

V. Vegetables are not formed of water, but of a certain peculiar terrestrial matter.

It has been shewn, that there is a considerable quantity of this matter both in spring, rain, and river water; and the experiments before-mentioned shew, that the much greatest part of the fluid mass that ascends up into plants, does not settle or abide there, but passes through the pores of them, and exhales into the atmosphere; and that a great part of the terrestrial matter mixed with the water, passes up into the plant along with it, and that the plant is more or less augmented, in proportion as the water contains a greater or less quantity of matter; from all which we may reasonably infer, that earth, and not water, is the matter which constitutes vegetables.

One of the sprigs of Mint before-mentioned drew up into it 2501 grains of the fluid mass, and yet had received but $3\frac{1}{2}$ grains of increase from it.

A second, though it had at first the disadvantage to be much less than a third, yet being set in water, wherein earth had been plentifully mixed, and the other in water without any such earth, it had vastly outgrown it, weighing at least 145 grains more than that did.

A fourth plant, though at first a great deal less than the fifth, yet being set in foul crass water, that was left in the still, after that in which the last was set was drawn off, had gained in weight at the end, above double what that in the finer and thinner water had. The proportion of the augment of that plant, which thrived most, was in the said mass spent upon it, but as 1 to 46; in others as one to 60, 100, 200; and in the Cataputia, but as 1 to 714.

One of the sprigs took up 39 grains of water a day, one day with another, which was much more than the whole plant originally; and yet it gained not $\frac{1}{4}$ of a grain a day in weight.

And another took up 253 grains a day, which was near twice as much as its original weight; and after all, the daily increase of the plant was no more than $2\frac{1}{2}$ grains.

VI. Spring and rain water contain near an equal charge of vegetable matter; river water more than either of them.

These proportions hold in the main, but a strict and just composition is hardly to be expected; inasmuch as in all probability, the water that falls in rain, contains sometimes a greater share of terrestrial matter, than that which falls at other times; a more powerful and intense heat, of necessity, hurrying up a larger quantity of that matter, along with the humid vapours that form rain, than one more feeble and remiss possibly can.

The water of one spring may flow forth with a higher charge of this matter than that of another, this depending partly upon the quickness of the ebullition of the water, and partly on the quantity of that matter latent in the strata, thro' which the fluid passes, and the greater or less laxity of those strata; for the same reason the water of one river may abound with it more than that of another; nay, the same river, when much agitated and in commotion, must bear up more of it, than when it moves with less rapidity and violence. That there is a great quantity of ordinary fertility of the earth; the Nile affords a pregnant instance, and so does the Ganges and other rivers, which annually overflowing the neighbouring plains, their banks shew the fairest and largest crops of any in the world.

VII. Water serves only for a vehicle to the terrestrial matter which forms vegetables, and does not itself make any augmentation to them.

Where the proper terrestrial matter is wanting, the plant is not augmented, though never so much water ascend into it: water then is not the matter that composes vegetable bodies; it is only the agent that conveys the matter into them, that distributes it to their several parts to their nourishment; that matter is sluggish and inactive, and would lie eternally confined to its beds of earth, without advancing up into plants, did not water or some like instrument fetch it forth, and carry it into them.

This fluid is capacitated several ways for the office here assigned it, by the figure of its parts, which appears from many experiments to be exactly and mathematically spherical, their surfaces being perfectly polite, and without any the least irregularities.

It is evident, that corpuscles of such a figure are easily susceptible of motion, and far above any others whatever, and consequently more capable of moving and conveying other matter that is not so active; then the intervals of the bodies of that figure are, in respect to their bulk, of all others the largest, and so the most fitted to receive and entertain foreign matter in them; besides, as far as the trials hitherto made inform us, the constituent corpuscles of water are each singly considered absolutely solid, and do not yield to the greatest external force; this secures their figure against any alteration, and the intervals of their corpuscles must be always alike.

By the latter it will be ever disposed to receive matter into it; and by the former, when once received, to bear it along with it. Water is farther capacitated to be a vehicle to this matter, by the tenuity and fineness of the corpuscles of which it consists. We hardly know any fluid in all nature, except fire, whose constituent parts are so exceeding subtle and small as those of water are; they will pass pores and interstices that neither air nor any other fluid will. This enables them to enter the tubes, and finest vessels of plants, and to introduce the terrestrial matter, and convey it to all parts of them, whilst each, by means of organs it is endued with for that purpose, intercepts and assumes into itself, such particles as are suitable to its own nature, letting the rest pass on through the common ducts.

VIII. Water is not capable of performing this office to plants, unless assisted by a due quantity of heat.

Heat must concur, or Vegetation will not succeed. The plants set in the glasses in October, and the following

lowing months, had not near the quantity of water sent up into them, or so great an additional increase by much as those that were set in June, July, or the hotter months.

It is plain the water has no power of moving itself, or rising to the vast height it doth, in the more tall and lofty plants; so far from it, that it doth not appear by any discovery yet made, that even its own fluidity consists in the intestine motion of its parts, whatever the Cartesians think.

Indeed we want nothing more to solve all the phenomena of fluidity, than such a figure and disposition of parts as water has: spherical corpuscles must stand so ticklish upon each other, as to be susceptible of every impression, and though not perpetually in motion, must be always ready and liable to be put into it by any the slightest force imaginable. It is true, the parts of fire or heat are not capable of moving themselves any more than those of water, but they are more subtile, light, and active than those are, and so the more easily put in motion.

That the concurrence of heat is really necessary in this work, appears not only from the experiments before us, but from all nature, from the fields and forests, gardens and orchards. We see in autumn, as the sun's power is gradually less and less, so its effect on plants is remitted, and Vegetation slackens by little and little.

Its failure is first discernible in trees, which, being raised highest above the earth, require a more intense heat to elevate the water charged with nourishment to their tops, so that, for want of fresh support and nutriment, they shed their leaves, unless supported by a very firm and hard constitution, as our evergreens are. Next, the shrubs part with theirs; then the herbs and lower tribes, the heat at length not being sufficient to supply even to these, though so near the earth, the fund of their nourishment.

As the heat returns the succeeding spring, they all recruit again, and are furnished with fresh supplies and verdure; but first, those which are lowest, and nearest the earth, and that require a less degree of heat to raise the water with its earthy charge into them, then the shrubs and higher vegetables in their turn, and lastly the trees.

As the heat increases, it grows too powerful, and hurries the matter with too great rapidity through the finer and more tender plants; these therefore go off and decay, and others that are more hardy and vigorous, and require a greater degree of heat, succeed in their order. By which mechanism, provident nature furnishes us with a very various and different entertainment, and what is best suited to each season all the year round.

As the heat of the several seasons affords us a different face of things, the several distant climates shew the different scenes of nature, and productions of the earth.

The hotter countries ordinarily yield the largest and tallest trees, and those too in a much greater variety than the colder; even those plants common to both attain to a much greater bulk in the southern, than in the northern climates.

Nay, there are some regions so cold, that they raise no vegetables at all to a considerable size; this we learn from Greenland, Iceland, and other parts of like cold situation and condition: in these there are no trees, and the shrubs are poor, little, and low.

Again, in the warmer climates, and such as furnish trees and the large vegetables, if there happen a remission or diminution of the usual heat, their productions are impeded in proportion. Our own summers give us proof enough of this, for though at such times there is heat sufficient to raise the vegetative matter into the lower plants, as Wheat, Barley, Peas, and the like, and we have plenty of Strawberries, Raspberries, Gooseberries, Currants, and the fruits of such vegetables as are low, and near the earth, and a moderate store of Cherries, Plums, &c. and some others, that grow at something of a greater height, yet our Apples,

Pears, Peaches, Nectarines, and Grapes, and the production of warmer countries, have been fewer, and those not so thoroughly ripened, and brought to perfection as they are in more benign seasons.

Nor is it that heat only which promotes Vegetation, but any other indifferently, according to its power and degree, as we find from our stoves, hot-beds, &c.

And by the rightly adapting of these artificial heats, the English gardeners have of late years so much improved their art, as in a great measure to supply the want of natural heat, and to vie with the people, who inhabit countries several degrees south of England, in the early products of esculent plants, and the accelerating and ripening the fruits of the warmest climates. And as the knowledge of Vegetation is improved, and the practitioners of the art are better acquainted with the theory, it may be hoped the art may be farther extended and improved; therefore it is highly necessary, that the theory of Vegetation should be studied by every person who proposes to make any proficiency in gardening and agriculture.

VELLA. Lin. Gen. Plant. 714. Spanish Cress.

The CHARACTERS are;

The empalement of the flower is cylindrical, and composed of four linear obtuse leaves, which drop off. The flower has four petals in form of a cross, whose tails are the length of the empalement, and six stamina of the same length, two of which are a little shorter, terminated by single summits, and an oval germen, supporting a conical style, crowned by a single stigma. The germen afterward turns to a globular capsule with two cells, divided by an intermediate partition twice as large as the pod, and is oval and erect, stretching beyond the capsule; each cell containing one seed.

This genus of plants is ranged in the first section of Linnæus's fifteenth class, which includes those plants whose flowers have two long and two shorter stamina, and the seeds are included in short pods.

The SPECIES are,

1. VELLA (*Annua*) foliis pinnatifidis, filiculis pendulis. Lin. Sp. Plant. 641. *Vella with wing-pointed leaves, and hanging pods.* Nasturtium sylvestre Valentinum. Clus. Hist. 2. p. 130. *Wild Cress of Valentia.*
2. VELLA (*Pseudo Cytisus*) foliis integris obovatis ciliatis filiculis erectis. Lin. Sp. Plant. 641. *Vella with entire, oval, ciliated leaves, and erect pods.* Pseudo cytisus flore leucoli luteo. C. B. P. 230. *Bastard Cytisus with a flower like the yellow Wall-flower.*

The first sort grows naturally in Valentia; it is an annual plant, which seldom rises more than one foot high. The stalk divides toward the top into several branches, each ending in a loose spike of flowers, which are followed by round swelling pods, having a leafy border or crest on the top, which is hollowed like a helmet. The pod opens with two valves, and has two cells, which contain roundish seeds like those of Mustard. The leaves are jagged, and end in many points.

This plant is preserved in gardens for the sake of variety, but as it is not very beautiful, nor of any use, it is seldom cultivated unless in botanic gardens. If the seeds of this plant are permitted to scatter, the plants will come up and thrive very well; or if they are sown in autumn, they will succeed much better than those which are sown in the spring; for when the season proves dry, those seeds which are sown in the spring, frequently lie in the ground till the following autumn before the plants appear; whereas those which are sown in autumn, always come up soon after, or early in the spring, so will more certainly produce ripe seeds. These plants should not be transplanted, therefore the seeds should be sown where the plants are to remain, and if they are kept clean from weeds, and thinned where they are too close, they will require no other culture.

The second sort grows naturally in Spain. The leaves of this are entire, hairy, and sit close to the stalk; they are oval, and of a grayish colour. The stalks become ligneous; they rise about two feet high, and are terminated by roundish bunches of pale yellow

yellow flowers, which stretch out in length; the flowers have four cross-shaped petals, and are succeeded by pods like the former. This plant will continue two or three years; it is propagated by seeds in the same manner as the former.

VERATRUM. Tourn. Inst. R. H. 272. tab. 145. Lin. Gen. Plant. 1013. [so called as though ver atrum, i. e. truly black, because this plant has a black root, or because it purges a black humour.] White Hellebore; in French, *Ellebore blanc*.

The CHARACTERS are,

It has hermaphrodite and male flowers intermixed in the same spike. The flowers have no empalement; they have six oblong spear-shaped petals which are permanent, and six awl-shaped stamina sitting on the point of the germen, spreading asunder, terminated by quadrangular summits; they have three oblong erect germen sitting upon the style, which are scarce visible, crowned by a single spreading stigma. The germen afterward become three oblong, erect, compressed capsules with one cell, opening on the inside, including many oblong, compressed, membranaceous seeds. The male flowers have the same characters of the hermaphrodite, but are barren.

This genus of plants is ranged in the first section of Linnæus's twenty-third class, which contains those plants which have flowers of different sexes in the same plant.

The SPECIES are,

1. VERATRUM (*Album*) racemo supradecomposito, corollis erectis. Lin. Sp. Plant. 1044. *White Hellebore with a spike decomposed above, and erect petals. Veratrum flore subviridi.* Tourn. Inst. R. H. 273. *White Hellebore with a greenish flower.*
2. VERATRUM (*Nigrum*) racemo composito, corollis patentissimis. Lin. Sp. Plant. 1044. *White Hellebore with a compound spike, and very spreading petals. Veratrum flore atrorubente.* Tourn. Inst. R. H. 273. *White Hellebore with a dark red flower.*
3. VERATRUM (*Luteum*) racemo simplicissimo, foliis sessilibus. Lin. Sp. Plant. 1044. *White Hellebore with a single spike, and leaves sitting close to the stalk. Veratrum caule simplicissimo, foliis sessilibus.* Flor. Virg. 195. *White Hellebore with a single spike.*
4. VERATRUM (*Americanum*) racemo simplicissimo, corollis patentibus, staminibus longioribus. *White Hellebore with a single spike of flowers; spreading petals, and longer stamina.*

The first sort grows naturally on the mountains in Austria, Helvetia, and Greece. The root is perennial, and composed of many thick fibres gathered into a head; the leaves are oblong, oval, ten inches long, and five broad in the middle, and rounded at the points, having many longitudinal plaits like those of Gentian; the stalks rise three or four feet high, and branch out on every side almost their whole length; under each of these branches is placed a narrow plaited leaf, which diminishes in its size as it is nearer the top of the stalk. The branches and principal stalk are terminated by spikes of flowers set very close together, which are composed of six petals which stand erect; these are green, and in their center is situated three obtuse germen. From the point of these arise six stamina which spread asunder, and are terminated by four-cornered summits. These appear in June and July, and are each succeeded by oblong compressed capsules with one cell, filled with membranaceous seeds.

The second sort grows naturally in Hungary and Siberia; it has a perennial root like the former. The leaves are longer and thinner than those of the first sort; they are plaited in the like manner, but are of a yellowish green colour, and appear sooner in the spring; the stalks rise higher than those of the former. It has fewer leaves upon it, and does not branch out into so many spikes: the flowers of this are of a dark red colour, and the petals spread open flat, in which it differs from the former. This flowers almost a month before the other.

The third sort grows naturally in Virginia, and other

parts of North America, where it is sometimes called Rattle Snake Root. The root of this is tuberous and large; the leaves are oblong, and shaped like those of Plantain, having several longitudinal furrows or plaits; they are four or five inches long, and two broad in the middle, spreading themselves on the ground. Between these come out a single stalk which rises near a foot high, having a few very small leaves or sheaths placed alternately; and at the top the flowers are produced in a single, thick, close spike; they are small, and of a yellowish white colour; these appear in June, but are rarely succeeded by seeds here.

The fourth sort was sent me from Philadelphia by Mr. John Bartram, who found it growing naturally in that country. The root of this is composed of thick fleshy fibres; the leaves are oblong, oval, of a light green colour, having six longitudinal veins or plaits; they are four or five inches long, and between two and three broad, spreading on the ground; these are rounded at their points, and continue all the year. In the center of the leaves springs up a single erect stalk a foot high, having a few vestiges or small leaves standing alternately close to the stalk, which end in acute points. The stalk is terminated by a thick obtuse spike of dark red flowers, whose petals spread open flat. In the center of the petals is situated three obtuse germen joined together, from whose point arises six stamina which spread asunder, and are longer than the petals; these are terminated by four-cornered summits of a purple blue colour. This plant flowers the latter end of June, and in warm seasons the seeds will ripen here.

The first of these plants is that which is ordered for medicinal use, and is by much the stronger and more acrid plant than the second; for when both sorts are placed near each other, the snails will entirely devour the leaves of the second sort, when at the same time they scarcely touch those of the first.

These plants are very pretty ornaments, when planted in the middle of open borders of the pleasure-garden; for if they are placed near hedges or walls, where snails generally harbour, they will greatly deface the leaves, especially of the second sort, by eating them full of holes before they are unfolded; and as a great part of the beauty of these plants is in their broad-folded leaves, so when they are thus defaced, the plants make but an indifferent appearance.

Both these sorts may be propagated by parting their roots in autumn, when their leaves decay, but they should not be parted too small, for that will prevent their flowering the following summer; these heads should be planted in a light, fresh, rich soil, in which they will thrive exceedingly, and produce strong spikes of flowers. The roots should not be removed oftener than once in three or four years, by which time, (if they like the soil,) they will be very strong, and produce many heads to be taken off; but if they are frequently transplanted, it will prevent their increasing, and cause them to flower very weak.

These plants may also be propagated by seeds, which should be sown as soon as ripe, either in a bed or box filled with fresh light earth, and the ground kept constantly from weeds. In the spring the plants will appear, at which time, if the season proves dry, you should now and then refresh them with water, which will greatly promote their growth; and you must carefully clear them from weeds, which, if permitted to grow, will soon overspread and destroy these plants while young. The autumn following, when their leaves decay, you should prepare a bed of fresh light earth, and carefully take up the young plants (observing not to break their roots) and plant them therein about six inches square, where they may remain until they are strong enough to flower, when they should be transplanted into the borders of the pleasure-garden; but, as these plants seldom flower in less than four years from seeds, this method of propagating them is not much practised in England.

The two American forts are at present rare in the English gardens, but, as they hardy enough to thrive in the open air, in a few years they may become plenty; these may be propagated by offsets or seeds, in the same manner as the former.

VERBASCUM. Tourn. Inst. R. H. 146. tab. 61. Lin. Gen. Plant. 217. Mullein; in French, *Bouillon blanc*.

The CHARACTERS are,

The flower has a small permanent empalement of one leaf, cut into five parts; it hath one wheel-shaped petal, with a very short cylindrical tube, the brim spreading, and cut into five oval obtuse segments, and five awl-shaped stamina which are shorter than the petal, terminated by roundish, compressed, erect summits; with a roundish germen supporting a slender style inclining to the stamina, crowned by a thick obtuse stigma. The germen afterward becomes a roundish capsule with two cells opening at the top, having a half oval receptacle fixed to the partition, and filled with angular seeds.

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. VERBASCUM (*Thapsus*) foliis decurrentibus utrinque tomentosis. Vir. Cliff. 13. *Mullein with running leaves which are woolly on both sides. Verbascum mas latifolium luteum. C. B. P. 239. Great white Mullein, Hig Taper, or Cow's Lungwort.*
2. VERBASCUM (*Lychnitis*) foliis cuneiformi-oblongis. Hort. Upsal. 45. *Mullein with oblong wedge-shaped leaves. Verbascum pulverulentum, flore luteo parvo. J. B. Hoary Mullein with small yellow flowers.*
3. VERBASCUM (*Album*) foliis cordato-oblongis, subtus incanis, spicis racemosis. *Mullein with oblong heart-shaped leaves which are hoary on their under side, and branching spikes of flowers. Verbascum fæmina, flore albo. C. B. P. 239. Female Mullein with a white flower.*
4. VERBASCUM (*Luteum*) foliis radicalibus ovatis petiolatis, caulinis oblongis sessilibus subtus tomentosis ferratis. *Mullein, with oval lower leaves growing on foot-stalks, but those on the stalks oblong, sawed, woolly on their under side, and sitting close. Verbascum blattariæ foliis nigrum, amplioribus foliis luteis, apicibus purpurascens. Flor. Leyd. Boerh. Ind. alt. 1. 228. Mullein with black Mullein leaves, large yellow petals to the flower, and purple summits.*
5. VERBASCUM (*Grandiflorum*) foliis ovato-acutis utrinque tomentosis, floribus in spicâ densissimâ sessilibus. Haller. Helvet. 507. *Mullein with oval acute-pointed leaves which are woolly on both sides, and flowers disposed in thick spikes sitting close to the stalk. Verbascum fæmina, flore luteo magno. C. B. P. 239. Female Mullein with a large yellow flower.*
6. VERBASCUM (*Nigrum*) foliis ferratis supernè rugosis, infernè subhirsutis, petiolis ramosis, staminum barbâ purpurascens. Haller. Helvet. 511. *Mullein with sawed leaves whose upper sides are rough, those on the under side hairy, branching foot-stalks, and purplish beards to the stamina. Verbascum nigrum, flore ex luteo-purpurascens. C. B. P. 240. Black Mullein with a yellowish purple flower, commonly called Sage-leaved black Mullein.*
7. VERBASCUM (*Sinuatum*) foliis radicalibus pinnatifido-repandis tomentosis, caulinis amplexicaulibus nudiusculis, rameis primis oppositis. Lin. Sp. 254. *Mullein whose under leaves are wing-pointed, woolly, and turn back, the upper naked, embracing the stalks, and the first branches are opposite. Verbascum nigrum, folio papaveris corniculati. C. B. P. 240. Black Mullein with a horned Poppy leaf.*
8. VERBASCUM (*Glabrum*) foliis amplexicaulibus oblongis glabris pedunculis solitariis. Hort. Upsal. 46. *Mullein with oblong smooth leaves embracing the stalks, and single foot-stalks to the flowers. Blattaria alba. C. B. P. 241. White Moth Mullein.*
9. VERBASCUM (*Blattaria*) foliis radicalibus pinnato-sinuatis, caulinis dentatis acuminatis semi-amplexicaulibus,

libus, pedunculis solitaris. *Mullein with the lower leaves jagged like wings, those on the stalks acute-pointed, indented, half embracing the stalks, and single foot-stalks to the flowers. Blattaria lutea, folio longo, laciniato. C. B. P. 240. Yellow Moth Mullein with a long jagged leaf.*

10. VERBASCUM (*Ferrugineum*) foliis ovato-oblongis obsolete crenatis, utrinque virentibus petiolatis, caule ramoso. *Mullein with oblong oval leaves having obsolete crenatures, and both sides green, with a branching stalk. Blattaria flore ferrugineo. H. R. Par. Moth Mullein with an iron-coloured flower.*

11. VERBASCUM (*Annuum*) foliis radicalibus oblongis integerrimis, utrinque viridibus, caulinis acutis sessilibus, pedunculis aggregatis. *Mullein with oblong, entire, lower leaves which are green on both sides, those on the stalks acute-pointed, sitting close, and clustered foot-stalks. Blattaria annua, flore majore luteo, capsulâ item majore. Mor. Hist. 2. p. 498. Annual Moth Mullein with a larger yellow flower, and a larger capsule.*

12. VERBASCUM (*Phœnicium*) foliis ovatis crenatis radicalibus, caule subnudo racemoso. Lin. Sp. Plant. 178. *Mullein with naked, oval, crenated, lower leaves, and an almost naked branching stalk. Blattaria purpurea. C. B. P. 241. Purple Moth Mullein.*

13. VERBASCUM (*Myconi*) foliis lanatis radicalibus, scapo nudo. Lin. Sp. Plant. 179. *Mullein with woolly lower leaves, and a naked stalk. Verbascum humile Alpinum villosum borraginis flore & folio. Tourn. Inst. 147. Low, hairy, Alpine Mullein, with the leaf and flower of Borage, commonly called Borage-leaved Auricula.*

The first is the common Mullein or Hig Taper which is used in medicine; this grows naturally by the side of highways and on banks in most parts of England; it is a biennial plant, which perishes soon after it has perfected seeds. The lower leaves, which spread on the ground, are nine or ten inches long, and six broad; they are very woolly, and of a yellowish white colour, having scarce any foot-stalks. The stalk rises four or five feet high, and the lower part is garnished with leaves shaped like those below, but smaller, whose base half embrace the stalk, and have wings running along the stalk from one to the other. The upper part of the stalk is closely garnished with yellow flowers, sitting very close, formed into a long thick spike; these are composed of five obtuse roundish petals, having five stamina in the center; they have an agreeable odour. It flowers in July, and the seeds ripen in autumn.

The second sort grows naturally in some parts of England; I have observed it in plenty in some parts of Nottinghamshire: this is a biennial plant. The lower leaves are oblong, indented on their edges, and end in acute points. The stalk rises three or four feet high, sending out from every joint short spikes of small yellow flowers, which are paler than those of the first, and have a pleasanter odour. At the base of each spike is situated a small, oblong, acute-pointed leaf; these are covered with a white powder which washes off. When the flowers decay, they are succeeded by oval capsules, filled with small seeds, which ripen in autumn.

The third sort grows naturally in Italy and Spain. The lower leaves of this are more than a foot long, and five or six inches broad, rough on their upper side, and a little hoary; their under side is pale and very hoary. The stalk rises six or seven feet high, sending out some side branches which are erect; the flowers are disposed in long spikes which are branched; they are white, and sometimes yellow, having the most agreeable scent of all the species. This flowers about the same time with the former, and the seeds ripen in autumn.

The fourth sort has oval leaves a foot long, and six inches broad in the middle, standing upon thick foot-stalks; they are of a soft texture, of a pale green on their upper side, but hoary on their under, having many prominent nerves. The stalk rises three or four feet

feet high; the lower part is garnished with smaller leaves of the same shape with those below; the upper part is garnished with pale yellow flowers disposed in a loose spike, having small leaves intermixed with the flowers the whole length. This flowers and ripens its seeds about the same time with the former.

The fifth sort has oval leaves which terminate in a point; they are of a yellowish green colour, and woolly on both sides. The stalks rise about four feet high; they are of a purplish colour, covered with a hoary down. The flowers sit very close to the stalk, forming a very thick spike, having no leaves between them; they are much larger than those of the first sort, and are of a deeper yellow colour. It flowers and ripens its seeds about the same time as the former.

The sixth sort grows naturally in several parts of England. The lower leaves of this are spear-shaped, and rounded at the foot-stalk, where they are indented like a heart; they are of a pale green on their upper side, and hoary on their under, indented on their edges; those upon the stalk are oblong, acute-pointed, and sawed. The stalks rise three or four feet high, the upper part ending in a long spike of yellow flowers, which are formed in short spikes or clusters on the side of the principal stalk; these have purplish stamina which are bearded; they have an agreeable odour at a small distance, but, if smelt too near, become less agreeable.

The seventh sort grows naturally in Italy and Greece, and also upon the rocks at Gibraltar. The lower leaves are oblong, sinuated on their borders, a little waved and hoary. The stalk rises four or five feet high, sending out many slender branches; the lower part of the stalk is garnished with heart-shaped leaves, whose base embrace the stalk; the upper part of the stalk and branches have no leaves, but the flowers are disposed along their sides in small clusters at distances; they are small, yellow, and have little odour.

The eighth sort grows naturally in the south of France and Italy. The leaves of this are oblong, smooth, and of a dark green colour; the stalk rises three or four feet high, and sends out two or three side branches; they are garnished with oblong, smooth, green leaves, whose base embrace the stalk. The flowers come out singly from the side of the stalk, upon foot-stalks an inch long; they have one petal, cut into five obtuse segments almost to the bottom; they are white within, and have a little blush of red on the outside: the seed-vessels of this sort are round, and filled with small seeds. This flowers about the same time as the former sorts.

The ninth sort grows naturally in some parts of England; this differs from the former, in the lower leaves being much longer; they are also deeply sinuated on their edges, in a regular manner, in imitation of the rangement of the lobes of winged leaves; they are of a brighter green colour than those of the former. The stalks rise much taller; the flowers are of a bright yellow colour, and the stamina, which are hairy, are of a purple colour.

The tenth sort is commonly cultivated in gardens here, and is commonly known by the title of Iron-coloured Moth Mullein; this has a perennial root, in which it differs from all the former sorts, though there are some who suppose it to be only a variety of the last mentioned, but it differs greatly from that in other respects. The bottom leaves are oblong, oval, a little crenated on their edges, but are almost entire; they are of a dark green on their upper side, of a pale green on their under side, standing upon pretty long foot-stalks. The stalk rises three or four feet high, branching out on each side, and has a few sharp-pointed small leaves on the lower part, sitting close to the stalk. The flowers are disposed in a long loose spike on the upper part of the stalk; they come out upon short slender foot-stalks, three or four from the lower joints; above those there are two at each joint, and at the top they are single; these are of one petal, cut almost to the bottom into five obtuse segments, and are of a rusty

iron colour, but are larger than those of the common sort. This plant flowers in July and August, but does not produce seeds here.

The eleventh sort grows naturally in Sicily, from whence the seeds were sent me; this is a biennial plant, which perishes soon after the seeds are ripe. The lower leaves of this are ten inches long, and two inches and a half broad, rounded at their points; they are entire, and of a deep green on both sides. The stalk is strong, and rises five or six feet high; it is garnished with small, acute-pointed, green leaves, whose base sits close to it. The flowers form a very long loose spike at the top; they stand upon slender foot-stalks, which come out in clusters from the side of the stalk; they are large, of a deep yellow colour, and are succeeded by large round capsules which are brown, opening in two parts, and filled with small dark-coloured seeds. It flowers in July and August.

The twelfth sort grows naturally in Spain and Portugal. The root of this is perennial; the leaves are oval, and of a light green colour; they are entire, and a little hairy; the stalk rises three feet high, and is almost naked of leaves, but the flowers are ranged along it almost the whole length, standing upon short foot-stalks, which for the most part come out single. The flowers are of a dark blue inclining to purple; these appear in June and July, but are not succeeded by seeds here.

The thirteenth sort grows naturally upon the Alps and Pyrenean Mountains; this is a very humble plant. The roots of this are composed of slender fibres; the leaves are thick, fleshy, and hairy; they are oval, crenated on their edges, and have compressed hairy foot-stalks; these are spread flat on the ground. Between them arise slender naked foot-stalks about four inches long, which divide into three or four small ones at the top, each sustaining one large blue flower, composed of five oval petals which spread open flat, and five thick erect stamina which stand erect. This flowers in May, and, after the flowers are past, the germen turns to an oblong-pointed capsule which opens in two parts, and is filled with small seeds.

The root of this is perennial, and the plant is usually propagated by offsets, which come out from the side of the old plant; these should be taken off in autumn, and planted in small pots filled with light sandy earth; they must always have a shady situation, for they will not thrive when they are exposed to the sun. The first nine and the eleventh sorts are biennial plants; these may be all cultivated by sowing their seeds in August, on a bed of light earth, in an open situation, where the plants will sometimes come up the succeeding month, and will endure the winter's cold very well, provided they have a dry soil. In February the plants should be transplanted where they are to remain, allowing them a greater distance; for, as they grow pretty tall and large, they must not be planted nearer than two feet asunder. In June following they will flower, and their seeds will be ripe in August or September: as the seeds of these plants frequently lie in the ground a whole year, so the ground should not be disturbed; but notwithstanding some of these plants grow wild in England, yet two or three of each kind may be admitted into large gardens, for the variety of their hoary leaves, together with the extreme sweetness of their flowers, which have a scent somewhat like Violet; and, as they require little care, they may be allowed a place in the borders of large gardens, where, during their continuance in flower, they will add to the variety; and, if their seeds are permitted to scatter, will come up without care, but the seventh sort seldom produces good seeds in England.

The tenth and twelfth sorts have perennial roots, and as they do not produce good seeds here, they are propagated by offsets; these should be taken off in autumn, time enough to get good root before winter, otherwise they will not flower the following summer. These plants thrive best in a sandy loam, and should

be planted on an east border, where they may have only the morning sun, for they do not thrive well when they are too much exposed to the sun.

VERBENA: Tourn. Inst. R. H. 200. tab. 94. Lin. Gen. Plant. 30. Vervain.

The CHARACTERS are,

The flower has an angular, tubulous, permanent empalement of one leaf, indented in five parts at the brim; it has one petal, with a cylindrical tube the length of the empalement, which is recurved, and cut into five points at the brim, which spread open, and are nearly equal; it has four very short bristly stamina within the tube, two of which are shorter than the other, with as many incurved summits as stamina, or half that number, with a four-cornered germen, supporting a slender style the length of the tube, crowned with an obtuse stigma. The germen afterward become two or four oblong seeds closely shut up in the empalement.

This genus of plants is ranged in the first section of Linnæus's second class, which includes those plants whose flowers have two stamina and one style.

The SPECIES are,

1. VERBENA (*Officinalis*) tetrandra, spicis filiformibus paniculatis, foliis multifido laciniatis, caule solitario. Lin. Sp. 20. Vervain with four stamina, slender spikes of flowers disposed in panicles, leaves having many-pointed jags, and a single stalk. Verbena communis, cæruleo flore. C. B. P. 269. Common Vervain with a blue flower.
2. VERBENA (*Hastata*) tetrandra, spicis longis acuminatis, foliis hastatis. Hort. Upsal. 8. Vervain with four stamina to the flowers, long acute-pointed spikes, and spear-shaped leaves. Verbena Americana, spicâ multiplici, foliis urticæ angustissimis, floribus cæruleis. Prod. Par. Bat. American Vervain with many spikes of blue flowers, and narrow Nettle leaves.
3. VERBENA (*Supina*) tetrandra, spicis filiformibus solitariis, foliis bipinnatifidis. Lin. Sp. 21. Vervain with four stamina to the flowers, single slender spikes of flowers, and double wing-pointed leaves. Verbena tenuifolia. C. B. P. 269. Narrow-leaved Vervain.
4. VERBENA (*Urticæfolia*) tetrandra, spicis filiformibus paniculatis, foliis indivisis ferratis petiolatis. Hort. Upsal. 9. Vervain with four stamina to the flowers, slender spikes growing in panicles, and undivided sawed leaves having foot-stalks. Verbena urticæ folio Canadensis. H. R. Par. Canada Vervain with a Nettle leaf.
5. VERBENA (*Spuria*) tetrandra, spicis filiformibus, foliis multifido laciniatis, caulibus numerosis. Hort. Upsal. 8. Vervain with four stamina to the flowers, slender spikes, leaves with many jagged points, and numerous stalks. Verbena urticæ folio Canadensis foliis incisissimis flore majore. H. R. Par. Nettle-leaved Vervain of Canada, with cut leaves and a larger flower.
6. VERBENA (*Bonariensis*) tetrandra, spicis fasciculatis, foliis lanceolatis amplexicaulibus. Hort. Upsal. 8. Vervain with four stamina to the flower, spikes disposed in bunches, and spear-shaped leaves embracing the stalks. Verbena Bonariensis altissima, lavendulæ Canariensis, spicâ multiplici. Hort. Elth. 406. Tallest Vervain of Buenos Ayres, with many spikes like the Canary Lavender.
7. VERBENA (*Carolina*) tetrandra, spicis filiformibus paniculatis, foliis infernè cordato-oblongis caulinis lanceolatis ferratis petiolatis. Vervain with four stamina to the flowers, slender spikes growing in panicles, the under leaves oblong and heart-shaped, and those on the stalks spear-shaped and sawed, having foot-stalks.
8. VERBENA (*Nodiflora*) tetrandra, spicis capitato-conicis, foliis ferratis, caule repente. Flor. Zeyl. 399. Vervain with four stamina to the flowers, spikes growing in conical heads, sawed leaves, and a creeping stalk. Sherardia repens, folio subrotundo crasso, nodiflora. Vail. Serm. Creeping Sherardia with roundish thick leaves, and flowers collected in knots.
9. VERBENA (*Indica*) diandra, spicis longissimis carnosissubnudis. Lin. Sp. Plant. 19. Vervain with two stamina to the flowers, and very long fleshy spikes which are almost naked. Verbena folio subrotundo ferrato, flore cæruleo. Sloan. Hist. 171. Vervain with roundish sawed leaves, and a blue flower.

10. VERBENA (*Americana*) diandra, spicis carnosissubnudis, foliis ovatis obtusis, obsolete crenatis petiolatis. Vervain with two stamina to the flowers, fleshy spikes which are almost naked, and oval obtuse leaves growing upon foot-stalks, having worn out indentures. Sherardia Americana, verbenæ folio subrotundo crasso, floribus cæruleis spicâ longissimâ & crassissimâ. Millar. American Sherardia with a thick, roundish, Vervain leaf, blue flowers, and a very long thick spike.

11. VERBENA (*Orubica*) diandra, spicis longissimis foliosis. Lin. Sp. Plant. 18. Vervain with two stamina to the flowers, and the longest leafy spikes. Sherardia urticæ folio subtus incano, floribus violaceis. Ehr. tab. 5. f. 1. Sherardia with a Nettle leaf, which is hoary on the under side, and a Violet-coloured flower.

12. VERBENA (*Jamaicensis*) diandra, spicis brevioribus, foliis ovatis ferratis, subtus incanis. Vervain with two stamina to the flowers, shorter spikes, and oval sawed leaves which are hoary on their under side.

13. VERBENA (*Stæchadifolia*) diandra, spicis ovatis, foliis lanceolatis ferrato-plicatis, caule fruticoso. Prod. Leyd. 327. Vervain with two stamina to the flowers, oval spikes, spear-shaped leaves which are sawed and plaited, and a shrubby stalk. Sherardia nodiflora, stæchadis ferrati-folii folio. Vail. Serm. 48. Sherardia with a knotted flower, and a leaf like that of the sawed-leaved Stæchas.

14. VERBENA (*Fruticosa*) diandra, spicis rotundis, foliis ovatis ferratis, caule fruticoso ramoso. Vervain with two stamina to the flowers, round spikes, oval sawed leaves, and a shrubby branching stalk. Sherardia nodiflora, fruticosa, foliis subrotundis ferratis. Hoult. MSS. Shrubby Sherardia, with a knotted flower and roundish sawed leaves.

15. VERBENA (*Angustifolia*) diandra, spicis carnosissubnudis, foliis lineari-lanceolatis obsolete ferratis. Vervain with two stamina to the flowers, naked fleshy spikes, and narrow spear-shaped leaves, with worn-out sawed edges. Sherardia spicata, folio angusto ferrato, flore cæruleo. Hoult. MSS. Sherardia with spiked blue flowers, and a narrow sawed leaf.

16. VERBENA (*Mexicana*) diandra, spicis laxis, calycibus fructus reflexo-pendulis subglobosis hispidis. Lin. Sp. Plant. 19. Vervain with two stamina to the flowers, loose spikes, the empalement of the fruit almost globular, prickly, and reflexed downward. Verbena Mexicana, trachelii folio, fructu aparines. Hort. Elth. 407. Mexican Vervain with a Throatwort leaf, and fruit like Clivers.

17. VERBENA (*Curassavica*) diandra, spicis laxis, calycibus aristatis, foliis ovatis argutè ferratis. Lin. Sp. Plant. 19. Vervain with two stamina to the flowers, loose spikes, bearded empalements, and oval leaves which are sharply sawed. Kempferia frutescens, chamædryos folio, floribus spicatis cæruleis. Hoult. MSS. Shrubby Kempferia with a Germander leaf, and blue spiked flowers.

18. VERBENA (*Rugosa*) diandra, spicis ovatis, foliis subrotundis ferratis & rugosis, caule fruticoso ramoso. Vervain with two stamina to the flowers, oval spikes, roundish, sawed, rough leaves, and a shrubby branching stalk. Sherardia arborescens nodiflora foliis ferratis & rugosis flore purpureo. Hoult. MSS. Tree-like Sherardia with a purple flower, and rough sawed leaves.

The first sort here mentioned, is very common on the side of roads and foot-paths near habitations; for although there is scarce any part of England, in which this plant is not found in plenty, yet it is never found growing above a quarter of a mile from a house; which occasioned its being called Simpler's Joy, because wherever this plant is found growing, it is a sure token of a house being near; this is a certain fact, but not easy to be accounted for. It is rarely cultivated in gardens, but is the sort directed by the College of Physicians for medicinal use, and is brought to the markets by those who gather it in the fields.

There is another species which approaches near to this, but is taller, the leaves are broader, and the flowers larger. It came from Portugal, and is by

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Tournefort titled *Verbena Lusitana*, *latifolia* procerior. Inst. R. H. 200. Taller broad-leaved Portugal Vervain. But I am in some doubt of its being specifically different from the common sort, though the plants in the garden grow much taller than that, and the flowers are larger, yet as there is so near an affinity, I cannot be sure they are different.

The second sort grows naturally in most parts of North America; this sends up many four-cornered furrowed stalks from the root, which rise five or six feet high, garnished with oblong leaves about three inches long, and one broad near the base, ending in acute points; they are deeply sawed on their edges, and stand upon slender foot-stalks by pairs; and from the same joints come out short branches, set with smaller leaves of the same form. The stalks are terminated by spikes of blue flowers in clusters, which appear in August, and if the autumn proves favourable, the seeds will ripen the middle of October.

The third sort grows naturally in Spain and Portugal; this is a biennial plant, which perishes soon after the seeds are ripe. The stalks rise near two feet high, and branch out greatly. The leaves are double wing-pointed, and sit close to the stalks. The flowers are disposed in long loose spikes singly at the end of the branches; they are of a light blue colour, and larger than those of the common sort. It flowers in July and August, and the seeds ripen in autumn.

The fourth sort grows naturally in most parts of North America; this is a biennial plant. The stalks are four-cornered, and rise about three feet high. The leaves are three inches long, and one broad in the middle, ending in acute points; they are sawed on their edges, and are placed by pairs. The stalks are terminated by panicles of flowers, which are long, slender, and sustain small white flowers, which are ranged loosely; these appear in July, and are succeeded by seeds which ripen in autumn.

The fifth sort grows naturally in North America; this is a biennial plant, whose bottom leaves are six inches long, deeply jagged on their sides, and sawed on their edges; they are rough, and of a deep green colour. The stalks rise two feet high, and are garnished at the joints with two smaller leaves of the same shape, placed opposite. The upper part of the stalk branches out into numerous foot-stalks, which sustain panicles of spiked blue flowers; these appear in July and August, and if the season proves favourable, the seeds will ripen in autumn.

The sixth sort grows naturally at Buenos Ayres; this has four-cornered stalks which rise to the height of five or six feet, sending out branches by pairs from the side; they are garnished with spear-shaped leaves which are three inches long, and about three quarters of an inch broad, whose base embrace the stalks; they are of a pale green colour, and are sawed on their edges. The stalks are terminated by spikes of blue flowers, which are clustered together. The longest spikes are about two inches, the other are about half so long; these appear late in summer, so are not often succeeded by good seeds in England.

The seventh sort grows naturally in Philadelphia. The seeds of this were sent me by Dr. Bensel; this is a perennial plant. The lower leaves are heart-shaped and rough; they are five inches long, and three and a half broad near their base, ending in acute points; they are of a dark green colour, and sawed on their edges. The stalks rise six feet high; they are four-cornered, and branch toward the top, and are terminated by slender spikes of white flowers, formed into panicles; these appear late in autumn, so that unless the season proves favourable, the seeds do not ripen here.

The eighth sort grows naturally in Virginia, and also in Jamaica; from the latter the late Dr. Houstoun sent me the seeds. The stalks of this trail upon the ground, and emit roots from their joints, whereby they spread, and propagate greatly; and from these arise other branches about eight or nine inches high, which are garnished with oval spear-shaped leaves,

placed opposite; these are about an inch long, and half an inch broad, sawed on their edges, and sit close to the stalks. The flowers are collected in conical heads, standing upon long naked foot-stalks which spring from the wings of the branches; they are of a yellowish white colour, and come late in autumn, so are rarely succeeded by good seeds here.

The ninth sort grows naturally in most of the islands in the West-Indies; this is an annual plant. The stalk rises a foot and a half high, and is garnished with oblong oval leaves placed by pairs; they are of a light green colour, and are sawed on their edges. The stalk is terminated by a long fleshy spike of blue flowers which appear in July, and are succeeded by two oblong seeds which ripen late in autumn. The spikes of flowers are from a foot to a foot and a half in length.

The seeds of the tenth sort were sent me from Panama, where it grows naturally in moist places; this is an annual plant, whose stalks rise about a foot high, and are garnished with oval, blunt-pointed, fleshy leaves, standing upon long foot-stalks; and at the same joints come out other stalks, sustaining three or four small leaves of the same shape; they are notched slightly on their edges, and are of a light green colour. The stalks are terminated by thick fleshy spikes of blue flowers, which appear late in autumn, so that unless the season proves warm, the seeds do not ripen in England.

The seeds of the eleventh sort were sent me from Panama, by the late Mr. Robert Millar; this rises with a shrubby stalk near three feet high, which divides into three or four branches; these are garnished with oblong oval leaves placed by pairs, which are deeply sawed on their edges; they are of a deep green on their upper side, but are hoary on their under; their foot-stalks are short, and have leafy borders running from the base of the leaves. The flowers grow on thick spikes, which terminate the branches, and are about a foot long. The flowers are large, and of a fine blue colour, so make a fine appearance, and have small acute-pointed leaves intermixed with them on the spikes. This plant flowers in August, and when the season proves warm, the seeds ripen in autumn.

The seeds of the twelfth sort were sent me from Paris, and were said to come from Senegal in Africa; this is a perennial plant, with a branching stalk which rises near two feet high, and is garnished with oval sawed leaves placed by pairs, which are two inches and a half long, and almost two inches broad, of a deep green on their upper side, but hoary on their under, and have pretty long foot-stalks. The flowers are disposed in fleshy spikes at the end of the branches; these spikes are shorter, and not so thick as those of the former sorts. The flowers are small and white, so make no great appearance; they appear in June and July, and the seeds ripen in autumn; but the plants may be preserved two or three years in a warm stove.

The thirteenth sort grows naturally in Jamaica, and several other places in the West-Indies. The seeds of this were sent me from La Vera Cruz by the late Dr. Houstoun; this rises with a shrubby branching stalk five or six feet high. The branches are adorned with spear-shaped leaves, which are two inches long, and half an inch broad; these are sawed on their edges, the teeth of the jags coming from the point of a fold or plait in the leaf; these stand by pairs upon short foot-stalks. The flowers stand upon long naked foot-stalks, which rise from the wings of the stalk; they are blue, and are collected in oval heads; these appear late in autumn, and unless the season proves warm, the seeds do rarely ripen in England, but the plants may be kept two or three years in a warm stove.

The fourteenth sort was found growing naturally at Campeachy by the late Dr. Houstoun, who sent the seeds to England; this has a shrubby branching stalk, which rises three or four feet high. The branches are garnished with oval sawed leaves set on by pairs; they are

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are of a light green colour, about an inch and a half long, and near an inch broad. The flowers are of a pale blue colour, collected into oval heads which stand upon long naked foot-stalks, springing from the wings of the branches; these flower late in autumn, and are not succeeded by seeds in England.

The fifteenth sort grows naturally at La Vera Cruz, from whence the late Dr. Houstoun sent the seeds; this is an annual plant, with a branching stalk which rises a foot and a half high, garnished with pale green leaves three inches and a half long, and half an inch broad, ending in acute points, and are slightly sawed on their edges. The branches are terminated by fleshy spikes of blue flowers which are naked; these appear in August, and in warm seasons are succeeded by seeds which ripen in autumn.

The sixteenth sort grows naturally in Mexico; this hath a shrubby stalk which rises five or six feet high, and divides into several branches, which are garnished with oblong sawed leaves which end in acute points; they are two inches long, and one broad near their base, sitting close to the branches; they are of a light green colour on both sides. The branches are terminated by slender loose spikes of pale flowers which are very small, whose empalements afterward become swelled, and almost globular; they are reflexed downward, and are set with stinging hairs. It flowers late in the summer, and in good years the seeds ripen in England.

The seeds of the seventeenth sort were sent me from La Vera Cruz, by the late Dr. Houstoun; this has a slender ligneous stalk which branches out on each side, and rises near three feet high; the branches are adorned with small oval leaves, which are sharply indented on their edges; they are of a light green colour, and stand upon short foot-stalks. The flowers stand sparsely upon slender footstalks arising from the wings of the branches; these are naked, six or seven inches in length, and toward the top the flowers are ranged at a distance from each other in a loose spike; they are small, and of a bright blue colour, sitting very close; these are succeeded by two seeds inclosed in the empalement, which is terminated by short awns or beards. This plant has flowered in the Chelsea Garden, but did not produce seeds.

The eighteenth sort was discovered by the late Dr. Houstoun growing naturally at Campeachy, from whence he sent the seeds to England; this has a strong woody stalk, which rises ten or twelve feet high, covered with a light brown bark, and sends out many ligneous branches on every side, which are garnished with roundish, sawed, rough leaves, of a light green colour, standing upon short foot-stalks. The flowers are small, of a pale blue colour, and are collected into oval heads, standing upon naked foot-stalks which spring from the wings of the branches; these seldom appear in this country, and are not succeeded by seeds here; but the plants are easily propagated by cuttings during the summer months, and may be preserved many years in a moderate stove.

The first sort, as was before observed, being a common weed in England, is not kept in gardens.

The third sort may be easily propagated by seeds which should be sown in autumn, and requires no other culture than to keep it clean from weeds, and thin the plants where they are too close.

The fourth and fifth sorts may also be propagated in the same manner, and are equally hardy. If the seeds of these three sorts are permitted to scatter, the plants will come up the following spring.

The second and seventh sorts have perennial roots, and are hardy enough to thrive in the open air; these may be propagated by seeds, which should be sown in autumn, for when they are sown in the spring, they rarely grow the same year; these plants require no other culture but to keep them clean from weeds, and allow them proper room to spread; they may also be propagated by parting their roots in autumn. They love a soft loamy soil not too dry.

The other sorts being natives of warmer climates, re-

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quire more care. The seeds of these should be sown upon a hot-bed early in the spring, and when the plants are fit to remove, they should be each transplanted into a separate small pot, and plunged into a fresh hot-bed to bring them forward; they must be shaded in the day time with mats until they have taken new root, then they must be treated in the same method as other tender plants from the same countries.

Those sorts which are annual must be removed into the stove, or a good glass-case, when they are become too tall to remain longer under the frames; for if they are placed abroad in the open air, they will not ripen their seeds here, unless the summer is very warm; and where there is a convenience of having a bark-bed in a glass-case, for plunging some of these tender annual plants, they will thrive much better, and come to greater perfection than those which are placed on shelves.

The sorts which are perennial may be kept in such a glass-case till autumn, allowing them a large share of air in warm weather, to prevent their drawing up weak as they increase in their size; but this must be done with caution, for if they are put into pots too large, they will not thrive.

The seventeenth sort is by much the tenderest plant of all the species, and is very difficult to preserve when young. The seeds of this should be sown in a small pot, and plunged into a good hot-bed of tanners bark. When the plants appear, they should be shaded from the sun in the heat of the day. They must be frequently refreshed with water, but it must be given to them sparingly, for much wet will kill them. When they are transplanted into small pots, they must be carefully shaded till they have taken new root, and they must be constantly kept in the bark-bed.

VERBESINA. Lin. Gen. Plant. 873. Eupatoriophalacron. Vaill. Act. Par. 1720.

The CHARACTERS are,

The common empalement of the flower is concave, and composed of a double order of leaves, which are channelled. The flower is made up of hermaphrodite florets in the disk, and female half florets in the border or rays. The hermaphrodite florets are funnel-shaped, and cut into five parts at the brim; they have five very short hair-like stamina, terminated by cylindrical summits, and a germen the same figure as the seed, supporting a slender style, crowned by two reflexed stigmas. The germen afterward becomes a thick angular seed, crowned by a few three-pointed chaff. The female half florets are stretched out on one side in shape of a tongue, which form the rays; these have no stamina, but have a germen, style, and two stigmas like the hermaphrodite florets, and are succeeded by seeds like those.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which includes those plants whose flowers are composed of hermaphrodite and female florets which are all fruitful.

The SPECIES are,

1. VERBESINA (*Alata*) foliis alternis decurrentibus undulatis obtusis. Hort. Cliff. 411. *Verbesina with alternate running leaves, which are obtuse and waved. Biddens Indica hieracii folio caule alato. Tourn. Inst. 462. Indian Water Hemp Agrimony, with a Hawkweed leaf and a winged stalk.*
2. VERBESINA (*Alba*) foliis lanceolatis serratis sessilibus. Hort. Cliff. 500. *Verbesina with spear-shaped sawed leaves, which sit close to the stalks. Eupatoriophalacron balsaminæ fœminæ folio, flore albo discoide. Vaill. Act. Par. 1719. Eupatoriophalacron with a female Balsamine leaf, and a white discous-shaped flower.*
3. VERBESINA (*Lavenia*) foliis ovatis trinerviis glabris petiolatis, seminibus tricornuis. Flor. Zeyl. 310. *Verbesina with oval three-veined leaves, having foot-stalks and seeds with three horns. Eupatoriophalacron scrophulariæ aquaticæ foliis oppositis. Burm. Zeyl. 94. Eupatoriophalacron with leaves like those of the Water Betony, and placed opposite.*

4. VERBESINA (*Prostrata*) foliis lanceolatis serratis alternis geminis sessilibus, floribus sessilibus. *Verbesina* with spear-shaped sawed leaves, and two flowers sitting close to the branches. An? *Verbesina* foliis oppositis lanceolatis serratis, floribus alternis geminis subsessilibus. Lin. Sp. Plant. 902. *Verbesina* with opposite, spear-shaped, sawed leaves, and double flowers which are placed alternate, and sit close to the stalk.
5. VERBESINA (*Pseudo Acmeila*) foliis lanceolatis subserratis, pedunculis flore longioribus. Flor. Zeyl. 308. *Verbesina* with spear-shaped leaves a little sawed, and the foot-stalks longer. *Bidens Zeylanica*, flore luteo, mellissæ folio, *Acmeila* dicta. Seb. Thes. 1. p. 19. *Bidens* with a yellow flower and a *Baum* leaf, called *Acmeila*.
6. VERBESINA (*Acmeila*) foliis oblongo-ovatis trinerviis subdentatis petiolatis, pedunculis elongatis axillaribus, floribus conicis. Lin. Sp. Plant. 1271. *Verbesina* with oblong oval leaves having three veins, and long foot-stalks from the wings of the stalks with conical flowers.
7. VERBESINA (*Nodiflora*) foliis ovatis serratis, calycibus oblongis sessilibus caulinis confertis lateralibus. Amœn. Acad. 4. p. 290. *Verbesina* with oval sawed leaves, and oblong empalements in clusters sitting close to the wings of the stalks. *Bidens nodiflora*, foliis tetrahit. Hort. Elth. 53. *Bidens* with a naked flower, and a *Nettle* leaf.
8. VERBESINA (*Mutica*) foliis trifido-laciniatis serratis, caule repente. Lin. Sp. Plant. 1273. *Verbesina* with trifid, cut, sawed leaves, and a creeping stalk. *Chrysanthemum palustre minimum repens*, apii folio. Sloan. Cat. Jam. 126. *Least Marsh Corn Marygold*, with a *Parsley* leaf.
9. VERBESINA (*Fruticosa*) foliis ovatis serratis petiolatis, caule fruticoso. Lin. Sp. Plant. 1271. *Shrubby Verbesina*, with oval sawed leaves upon foot-stalks. *Bidens frutescens*, ilicis folio, flore luteo. Plum. Sp. 10. *Shrubby Bidens* with an evergreen Oak leaf, and a yellow flower.

The first sort grows naturally in most of the islands of the West-Indies; it is an annual plant, with an upright winged stalk about two feet high, from the sides of which spring out toward the top a few short branches. The leaves are oval, blunt, and waved on their edges; they are three inches and a half long, and two broad, and are placed alternate; from the base of each leaf is extended a leafy border running along two sides of the stalk, so that it is winged the whole length. The flowers stand upon long naked foot-stalks, arising from the top and the wings of the stalk; they are of a deep Orange colour, and are composed of hermaphrodite and female florets, included in one common spherical empalement, and are both fruitful; these are succeeded by broad, compressed, bordered seeds with two teeth, which ripen in the empalement. This plant begins to flower in July, and continues till the frost kills them.

The second sort grows naturally in the West-Indies; this has an upright branching stalk a foot and a half high. The leaves are spear-shaped, about two inches long, and three quarters broad, a little sawed on their edges, sitting close to the stalk opposite. The flowers arise from the wings of the stalk, upon slender foot-stalks two inches long, three, four, or more springing from the same joint; each of these sustain one white radiated flower composed of many florets, which are succeeded by oblong black seeds. It flowers at the same time with the former.

The third sort grows naturally in both Indies; this rises with an upright branching stalk two or three feet high. The leaves are oval, acute-pointed, and smooth, having three longitudinal veins; they stand opposite upon pretty long foot-stalks. The flowers spring from the wings and ends of the branches; they are yellow, and stand upon short foot-stalks. It flowers about the same time with the former.

The fourth sort grows naturally in India; this has trailing stalks which spread on the ground; they extend two feet or more in length, and put out roots from their joints, sending out many side branches. The leaves are two inches long, and half an inch broad, smooth and entire. The flowers are very small

and white; these sit close to the stalks at the base of the leaves. They appear at the same time with the former.

The fifth sort grows naturally in Ceylon; this is an annual plant whose stalks rise two feet high, which are garnished with spear-shaped sawed leaves placed opposite. The flowers come out from the wings of the stalk upon very long foot-stalks; they are yellow, having short rays of female florets, of the same colour.

The sixth sort is the true *Acmeila*, which is a plant greatly esteemed in India: this grows naturally in Ceylon. The stalks rise two feet high, which are garnished with oblong, oval, indented leaves placed opposite at each joint; the foot-stalks of the flowers are very long, each supporting one yellow flower, whose rays are very short. This begins to flower in July, and continues producing them till the frost puts a stop to them, when the plant decays.

The seventh sort grows naturally in most of the islands of the West-Indies; it rises with stalks more than three feet high, which are garnished with oval sawed leaves placed opposite; they are near two inches long, and one broad; the flowers spring from the sides of the stalks in clusters, sitting very close thereto, having scarce any foot-stalks. The flowers are long, composed of several hermaphrodite florets which are yellow; these appear in July, and are succeeded by others till the frost stops them. The seeds ripen soon after the the flowers decay, and the first frost kills the plants.

The eighth sort grows naturally in moist places in Jamaica, where the stalks trail upon the ground and emit roots at their joints, which are garnished with trifid leaves, cut and sawed on their sides, standing opposite. The flowers are small; these arise from the joints of the stalks in July, and the seeds ripen in August.

The ninth sort grows naturally in the islands of the West-Indies; this rises with a shrubby stalk seven or eight feet high, garnished with oval leaves which are deeply sawed, and cut on their borders, somewhat like those of the *Ilex* or *Evergreen Oak*. The flowers are produced from the side of the stalks; they are yellow, and appear in July.

These plants are propagated by seeds, which should be sown upon a moderate hot-bed in the spring, and when the plants are fit to remove, they should be transplanted on a fresh hot-bed to bring them forward; they must be shaded till they have taken new root, then they must be treated in the same way as other tender annual plants, being careful not to draw them up too weak. In June they may be taken up with balls of earth, and planted in a warm border, where they must be shaded and watered till they have taken new root, after which they will require little care. These will produce good seeds in autumn, but several of them may be kept through the winter in a stove.

VERONICA. Tourn. Inst. R. H. 143. tab. 60. Lin. Gen. Plant. 25. Male Speedwell, or Fluellin; in French, *Veronique*.

The CHARACTERS are,

The flower has a permanent empalement cut into five acute segments; it has one petal, with a tube the length of the empalement; the brim is cut into four oval plain segments which spread open, and two stamina which are rising, terminated by oblong summits, with a compressed germen supporting a slender declining style, crowned by a single stigma. The germen afterward becomes a compressed heart-shaped capsule with two cells, filled with roundish seeds.

This genus of plants is ranged in the first section of Linnæus's second class, which contains those plants whose flowers have two stamina and one style.

The SPECIES are,

1. VERONICA (*Officinalis*) spicis lateralibus pedunculatis, foliis oppositis, caule procumbente. Lin. Mat. Med. 11. *Speedwell* with spikes of flowers growing upon foot-stalks, and springing from the sides of the stalks, leaves placed opposite, and a trailing stalk. *Veronica* mas su-

- pinâ & vulgatissimâ. C. B. P. 246. *Common male Speedwell, or Fluellin.*
2. VERONICA (*Spuria*) spicis terminalibus, foliis ternis æqualiter ferratis. Hort. Upsal. 7. *Speedwell with spikes of flowers terminating the stalks, which have three equal sawed leaves surrounding them. Veronica spicata angustifolia. C. B. P. 246. Narrow-leaved spiked Speedwell.*
 3. VERONICA (*Longifolia*) spicis terminalibus, foliis oppositis lanceolatis ferratis acuminatis. Hort. Upsal. 7. *Speedwell with spikes of flowers terminating the stalks, and acute-pointed sawed leaves which are lance-shaped, and placed opposite. Veronica major latifolia erecta. Mor. Hist. 2. p. 317. Greater, broad-leaved, upright Speedwell.*
 4. VERONICA (*Spicata*) spicâ terminali, foliis oppositis crenatis obtusis, caule adscendente simplicissimo. Lin. Sp. Plant. 10. *Speedwell with a spike of flowers terminating the stalk, obtuse crenated leaves placed opposite, and a single ascending stalk. Veronica spicata minor. C. B. P. 247. Smaller spiked Speedwell.*
 5. VERONICA (*Pannonica*) spicis lateralibus paniculatis, foliis ovatis inæqualiter crenatis sessilibus. *Speedwell with spikes of flowers proceeding in panicles from the wings of the stalk, and oval leaves which are unequally notched, and sit close. Veronica multicaulis pannonica. Tourn. Inst. 145. Hungarian Speedwell, having many stalks or spikes of flowers.*
 6. VERONICA (*Hybrida*) spicis terminalibus, foliis oppositis obtusè ferratis scabris, caule erecto. Lin. Sp. Plant. 11. *Speedwell with spikes of flowers terminating the stalk, rough, obtuse, sawed leaves, which are placed opposite, and have an erect stalk. Veronica spicata Cambro-Britannica, bugulæ subhirsuto folio. Raii Syn. Edit. 3. 278. Welsh spiked Speedwell, with a hairy Bugle leaf.*
 7. VERONICA (*Virginica*) spicis terminalibus, foliis quaternis quinifve. Lin. Sp. Plant. 9. *Speedwell with spikes of flowers terminating the stalks, and four or five leaves at each joint. Veronica Virginiana altissima, spicâ multiplici, floribus candidis. Flor Bat. Tall Virginian Speedwell, with many spikes and white flowers.*
 8. VERONICA (*Maritima*) spicis terminalibus, foliis ternis inæqualiter ferratis. Lin. Sp. Plant. 10. *Speedwell with spikes of flowers terminating the stalks, and leaves growing by threes, which are unequally sawed. Veronica foliis sæpius ternis. Vir. Cliff. 2. Speedwell with leaves generally growing by threes.*
 9. VERONICA (*Austriaca*) spicis lateralibus pedunculatis laxis, foliis oppositis linearibus argutè dentatis. *Speedwell with loose spikes of flowers growing upon foot-stalks, springing from the wings of the stalk, and very narrow leaves placed opposite, which are sharply indented. Veronica Austriaca, foliis tenuissimè laciniatis. Inst. R. H. Austrian Speedwell with leaves finely jagged.*
 10. VERONICA (*Orientalis*) spicis terminalibus, foliis pinnato-incisis acuminatis. *Speedwell with spikes of flowers terminating the stalks, and acute-pointed leaves cut in form of wings. Veronica Orientalis minima, foliis laciniatis. Tourn. Cor. 7. The least Eastern Speedwell having jagged leaves.*
 11. VERONICA (*Maxima*) racemis lateralibus, foliis cordatis rugosis dentatis, caule stricto. Lin. Sp. Plant. 13. *Speedwell with spikes of flowers proceeding from the wings of the stalk, rough, heart-shaped, indented leaves, and a strait stalk. Veronica maxima. Lugd. The greatest Speedwell, or false Germander.*
 12. VERONICA (*Incana*) spicis terminalibus, foliis oppositis crenatis obtusis, caule erecto tomentoso. Hort. Upsal. 7. *Speedwell with spikes of flowers terminating the stalks, crenated obtuse leaves placed opposite, and an erect woolly stalk. Veronica spicata lanuginosa & incana, floribus cæruleis. Amman. Ruth. 30. Hoary, woolly, spiked Speedwell with blue flowers.*
 13. VERONICA (*Fruticulosa*) spicis longissimis lateralibus pedunculatis, foliis oppositis inæqualiter ferratis. *Speedwell with the longest spikes of flowers springing from the wings of the stalk, growing upon foot-stalks, and leaves placed opposite which are unequally sawed. Veronica major frutescens altera. Mor. Hist. 2. p. 319. Another greater shrubby Speedwell.*
 14. VERONICA (*Becabunga*) racemis lateralibus, foliis

ovatis planis, caule repente. Flor. Suec. 111. *Speedwell with lateral spikes of flowers, oval plain leaves, and a creeping stalk. Veronica aquatica major, folio subrotundo. Mor. Hist. 3. 323. Greater Water Speedwell with a roundish leaf, commonly called Brooklime.*

There are a much greater number of species of this genus than are here enumerated, several of which grow naturally in England, but as they are rarely admitted into gardens, it is beside the intention of this work to mention them.

The first sort grows wild in woods, and other shady places in divers parts of England, and is a plant of little beauty; but, as it is the sort which is used in medicine, under the title of Paul's Betony, I thought it necessary to insert it here. This is a low plant, whose stalk trails upon the ground, and put out roots from their joints, whereby it spreads and propagates. The leaves are oval, about an inch long, sawed on their edges, and are placed opposite. The flowers are disposed in spikes which arise from the wings of the stalk; they are small, of a pale blue colour, and have one petal, which is cut at the brim into four segments; they appear in June, and when they decay, the germen turns to a capsule, not unlike that of Shepherd's Pouch in shape, filled with small seeds which ripen in August.

This is generally brought to market by such persons as make it their business to gather herbs in the fields, so that it is not often cultivated in gardens; but those who have a mind to propagate it, may do it with much ease, for as the branches trail upon the ground, they push out roots from their joints, which branches being cut off and planted, will take root, and grow in almost any soil or situation. The whole herb is used in medicine, and is one of the wound herbs which are brought from Switzerland. A tea of this herb is much recommended for the gout and rheumatism.

The second sort grows naturally in Italy and Spain; this has a perennial root, which sends out many offsets, by which it is easily propagated. The lower leaves of this are two inches long, and half an inch broad, of a pale green colour, and hairy; the stalks rise a foot high, they are garnished with very narrow spear-shaped leaves placed opposite, which have a few slight serratures on their edges. The stalks are terminated by long spikes of blue flowers, which appear in June and July; these are succeeded by seeds which ripen in autumn. It has been doubted, if this was specifically different from the common upright Speedwell; but I have many times propagated this by seeds, and have always found the plants so raised, maintain their difference. There is a variety of this with a flesh-coloured flower.

The third sort grows naturally in Austria and Hungary. The lower leaves of this are two inches long, and one broad in the middle, drawing to a point at each end; they are sawed on their edges, and are of a lucid green colour. The stalks rise a foot and a half high, and are garnished with leaves of the same shape with the lower, but are smaller, and placed opposite; they are terminated by long spikes of blue flowers which appear in June, and are succeeded by flat seed-vessels filled with compressed seeds, which ripen in autumn.

The fourth sort grows naturally in the northern parts of Europe, and in England grows in several closes near Newmarket Heath. The lower leaves of this are about an inch and a half long, and three quarters of an inch broad; they are of a pale green colour, and notched on their edges. The stalks rise a foot and a half high, they do not branch; the leaves on the lower part stand opposite, but on the upper part they are alternate; the stalks are terminated by short spikes of blue flowers, which appear about the same time as the former.

The fifth sort grows naturally in Hungary. The lower leaves of this are an inch and a half long, and three quarters of an inch broad, and are unequally notched; the stalks rise a foot high, and are garnished

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with the same sort of leaves placed opposite; these are of a lucid green, and sit close to the stalks. The flowers are disposed in paniced spikes, which stand upon long naked foot-stalks that spring from the upper wings of the stalk; they are larger than those of the other species, and are of a beautiful green colour, so make a fine appearance, but are of short duration. This sort flowers the beginning of June.

The sixth sort grows naturally on the Alps and Pyrenean mountains, and also upon the mountains in Wales. The lower leaves of this are rough and hairy; they are three inches long, and one and a half broad, blunt-pointed, and obtusely sawed on their edges, standing upon pretty long foot-stalks; the stalks grow erect, about six inches high, and are garnished with oval notched leaves placed opposite. From the side of the stalk spring out two or three branches, which toward the bottom are garnished with small leaves placed opposite, but terminate in long spikes of pale blue flowers. The spikes on these side branches are four or five inches long, but those of the principal stalk are eight or nine. This sort flowers in June and July.

The seventh sort grows naturally in Virginia. The stalks of this sort are erect, and rise four or five feet high, garnished at each joint by four or five spear-shaped leaves which stand round the stalk in whorls; these are sawed on their edges, and end in acute points. The stalks are terminated by long slender spikes of white flowers, which appear late in July; these are succeeded by compressed capsules filled with seeds, which ripen in autumn.

The eighth sort grows near the sea in several parts of Europe. The stalks of this do not rise so high as those of the former; the leaves are placed by fours and threes round the stalk, and have longer foot-stalks; they are broader at the base, and run out into long acute points; they are unequally sawed on their edges, and are of a bright green colour. The flowers are disposed in spikes which terminate the stalks, are of a bright blue colour, and appear in July. The seeds ripen in autumn.

The ninth sort grows naturally in Austria. The lower leaves of this are narrow, and cut into fine segments; the stalks are slender, and incline downward; they are garnished with linear leaves, which are acutely notched on their edges; the flowers are disposed in long loose spikes, which spring from the wings of the stalk; they are of a bright blue colour, and stand upon foot-stalks. This flowers the end of May and the beginning of June.

The tenth sort grows naturally in the Levant; this has slender branching stalks which decline, and are garnished with narrow leaves which are acutely cut on their edges; these are regular on both edges like the lobes of winged leaves; they are of a pale green colour, and smooth. The flowers are disposed in loose spikes on the top and side of the stalks; they are of a pale blue colour, and appear the end of April.

The eleventh sort grows naturally upon Mount Baldus in Italy. The stalks of this are slender, stiff, and upright, and are garnished by rough heart-shaped leaves, which are indented and placed opposite; those on the lower part of the stalk are small, in the middle they are much larger, and diminish again in their size toward the top. The flowers come out in long bunches from the wings of the stalk toward the top; they are of a bright blue colour, and appear in May.

The twelfth sort grows naturally in the Ukrain Tartary. The stalks of this are very white and woolly; they rise about a foot high, and are garnished with oblong hoary leaves placed opposite; they are two inches and a half long, three quarters of an inch broad, notched on their edges, and sit close to the stalks, which are terminated by spikes of deep blue flowers, and from the wings of the stalk toward the top are produced slender spikes of the like flowers, which stand erect. This flowers in June and July.

The thirteenth sort grows naturally in Austria and Bohemia. The stalks are slender, about a foot and

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a half long, inclining downward; the leaves are nearly oval, but are acute-pointed, about an inch long; they are unequally sawed, and sit close to the stalks. The flowers are disposed in long loose spikes, upon foot-stalks arising from the wings of the stalk; those on the lower part of the stalk are eight or nine inches long. The flowers are of a bright blue colour, and appear in May; the leaves of this sort are frequently variegated with yellow.

The fourteenth sort is the common Brooklime, which grows naturally in brooks and streams of water in most parts of England, so is not cultivated in gardens; but as it is much used in medicine, I have given it a place here. The stalks of this are thick, succulent, and smooth, emitting roots from their joints, whereby they spread and propagate. The leaves are oval, flat, succulent, and smooth; they stand opposite; the flowers come out in long bunches from the wings of the stalk; they are of a fine blue colour, and stand upon short foot-stalks; these appear great part of summer, and are succeeded by heart-shaped seed-vessels filled with roundish seeds. The whole herb is used, and is esteemed an excellent antiscorbutic.

These plants may all be propagated by parting their roots, which may be done every other year, for if they are not often parted or divided, they will many of them grow too large for the borders of small gardens; but yet they should not be parted into very small heads, because when they have not a number of stems so as to form a good bunch, they are soon past their beauty, and have but a mean appearance. The best time to part these roots is at Michaelmas, that they may be well rooted again before winter, for when they are removed in the spring, they seldom flower strong the same year, especially if the season should prove dry. Those sorts which grow pretty tall, are very proper to plant on the sides of open wilderness quarters, but those with trailing branches are fit for the sides of banks or irregular shady slopes, where they will make an agreeable variety; they are all of them hardy, so are in no danger of suffering by cold, and require no other care but to keep them clean from weeds, and to be transplanted every second or third year.

They may be propagated by seeds, which should be sown in autumn, for when they are sown in the spring, the plants rarely come up the same year; but as most of the sorts propagate very fast by their offsets, their seeds are seldom sown.

If these plants are placed in a shady border, they will thrive much better than when they are more exposed to the sun, and their flowers will continue much longer in beauty.

VIBURNUM. Lin. Gen. Plant. 332. Under this genus is included the Viburnum, Tinus, and Opulus of Tournefort. The Wayfaring, or pliant Meally-tree.

The CHARACTERS are,

The flower has a small permanent empalement, which is cut into five parts; it has one bell-shaped petal, cut at the brim into five obtuse segments which are reflexed; it has five awl-shaped stamina the length of the petal, terminated by roundish summits; and a roundish germen situated under the flower, having no style, but the place is occupied by a roundish gland, and crowned by three obtuse stigmas. The germen afterward turns to a roundish fruit with one cell, inclosing one hard roundish seed.

This genus of plants is ranged in the third section of Linnæus's fifth class, which includes those plants whose flowers have five male, and three female parts.

The SPECIES are,

1. VIBURNUM (*Lantana*) foliis cordatis ferratis venosis subtus tomentosis. Vir. Cliff. 25. *Wayfaring-tree with heart-shaped, sawed, veined leaves, which are woolly on their under side.* Viburnum. Math. 217. *The Wayfaring, or pliant Meally-tree of Italy.*

2. VIBURNUM (*Prunifolium*) foliis subrotundis crenato-ferratis glabris. Flor. Virg. 33. *Wayfaring-tree with roundish, crenated, sawed leaves which are smooth.* Mespilus

pilus prunifolia Virginiana, non spinosa, fructu nigricante. Pluk. Alm. 249. Virginia Haw with a Plum leaf having no thorns, and a black fruit, commonly called Black Haw, and by some Sheeps Turds.

3. VIBURNUM (*Dentatum*) foliis ovato-orbiculatis profunde ferratis venosis. *Wayfaring-tree, with oval round leaves which are deeply sawed, plaited and veined. An? Viburnum foliis ovatis dentato-ferratis plicatis. Lin. Sp. Plant. 268. Wayfaring-tree with oval, indented, sawed leaves.*
4. VIBURNUM (*Tinus*) foliis ovatis integerrimis, ramificationibus subtus villoso-glandulosis. Lin. Sp. Plant. 267. *Wayfaring-tree with oval entire leaves, whose branches are hairy, and glandulous on the under side. Tinus prior. Clus. Hist. 49. Hairy-leaved Laurustinus.*
5. VIBURNUM (*Lucidum*) foliis ovato-lanceolatis integerrimis utrinque virentibus lucidis. *Wayfaring-tree with oval spear-shaped leaves which are entire, shining, and green on both sides. Tinus 2d. Clusii Hist. 50. The shining-leaved Laurustinus.*
6. VIBURNUM (*Nudum*) foliis ovato-lanceolatis integerrimis, subtus venosis. *Wayfaring-tree with oval, spear-shaped leaves which are entire, and veined on their under side. Tinus foliis ovatis in petiolis terminatis integerrimis. Flor. Virg. 33. Tinus with oval leaves which are entire, and terminate in a foot-stalk.*
7. VIBURNUM (*Opulus*) foliis lobatis petiolis glandulosis. Lin. Sp. Plant. 268. *Wayfaring-tree with leaves divided into lobes, and glandulous foot-stalks. Opulus. Ruell. 281. Guelder-rose with flat flowers.*
8. VIBURNUM (*Americanum*) foliis cordato-ovatis acuminatis ferratis, petiolis longissimis lævibus. *Wayfaring-tree with heart-shaped, oval, acute-pointed, sawed leaves, growing upon very smooth foot-stalks. Opulus Americana, foliis acuminatis & ferratis, floribus albis. Dale. American Guelder-rose with acute-pointed sawed leaves, and white flowers.*
9. VIBURNUM (*Cassinoides*) foliis ovatis crenatis glabris oppositis, petiolis eglandulosis carinatis. *Wayfaring-tree with oval, crenated, smooth leaves placed opposite, whose foot-stalks have keel-shaped glands. Viburnum Phillyreæ folio. Duham. Arb. 2. p. 350. Viburnum with leaves like Phillyrea, commonly called Hysson-tea.*

The first sort grows naturally in England, in Italy, and other parts of Europe, and is the common Viburnum or Lantana of the old botanists. The leaves of this tree are heart-shaped, nine inches long, and four inches and a half broad; they are much veined, and irregularly sawed on their edges, and are very woolly on their under side. The stalks are woody, and rise near twenty feet high, sending out strong ligneous branches on every side, which are covered with a light coloured bark; these are terminated by umbels of white flowers whose summits are red. The flowers appear in June, and are succeeded by roundish compressed berries, which turn first to a bright red colour, and are black when ripe, inclosing one seed of the same shape.

There is a variety of this with variegated leaves, which is preserved in some of the gardens near London; but when the plants are removed into good ground, and are vigorous, their leaves become plain.

The second sort grows naturally in most parts of North America, where it is commonly called Black Haw; this rises with a woody stalk ten or twelve feet high, covered with a brown bark, and sends out branches from the side the whole length; these, when young, are covered with a purple smooth bark; they are garnished with oval smooth leaves two inches long, and an inch and a quarter broad, which are slightly sawed on their edges, and stand upon short slender foot-stalks, sometimes opposite, and at others without order. The flowers are disposed in small umbels, which come out from the side and at the end of the branches; they are white, and smaller than those of the common Viburnum; these appear in June, and are sometimes succeeded by berries which do not ripen here.

The third sort grows naturally in North America. The stalks of this are soft and pithy; they branch out greatly from the bottom upward. The bark is of a

gray colour; the leaves are roundish, oval, three inches long, and nearly as broad; they are strongly veined, and sawed on their edges, of a light green colour, and placed opposite upon pretty long foot-stalks. The flowers are disposed in a corymbus at the end of the branches; they are white, and almost as large as those of the common sort; these appear the latter end of June, but are not succeeded by seeds in England.

The fourth sort is the Laurustinus with small leaves, which are hairy on their under side; this plant is so well known as to need no description, but as it is frequently confounded with the next, it may be necessary to point out its difference. The leaves of this are seldom more than two inches and a half long, and one and a quarter broad; they are rounded at their base, but end in acute points; they are veined and hairy on their under side, and are not of so lucid a green colour on their upper side. The umbels of flowers are smaller, and appear in autumn, continuing all the winter, and the plants are much hardier.

The fifth sort is commonly known in the nursery-gardens by the title of shining-leaved Laurustinus. The stalks of this rise higher, and the branches are much stronger than those of the former sort. The bark is smoother, and turns of a purplish colour; the leaves are larger, of a thicker consistence, and of a lucid green colour; the umbels are much larger, and so are the flowers; these seldom appear till the spring, and when the winters are sharp, the flowers are killed, so never open unless they are sheltered. The plants of this sort were formerly kept in tubs, and housed in winter; and, when they were so treated, made a fine appearance early in the spring; and in very mild seasons, the plants in the open air do the same.

There is a variety of this with variegated leaves, which makes as good a figure as any of the striped plants which are preserved in gardens.

The sixth sort is a native of North America, where it rises to the height of ten or twelve feet, sending out branches on every side their whole length; these have a smooth purplish bark; they are garnished with oval entire leaves, five inches long, and two inches and a half broad, of a thick consistence, and a lucid green; they stand opposite. The flowers are produced in umbels at the end of the branches; they are white, and not unlike the flowers of Laurustinus; these appear in July, and are succeeded by berries which seldom ripen in England.

There seems to be two sorts of this in the gardens, one of which comes from the more northern parts of America, and sheds its leaves in winter; the other, which grows in Carolina and Virginia, is an evergreen, but both are so much alike in summer, as scarce to be distinguished.

The seventh sort is the common Marsh Elder, which grows naturally in marshy grounds, and on the sides of rivers in many parts of England, so is not often kept in gardens; it is called by some of the nursery-gardeners Guelder-rose with flat flowers, to distinguish it from the other, whose flowers are globular. The Marsh Elder is the original species, and Guelder-rose is a variety which accidentally arose from it. The former has a border of male flowers which are large, and the middle of the umbel is composed of hermaphrodite flowers, which are succeeded by oval red berries; the latter has all male flowers of the same size and shape with those of the border of the first, so that they swell out into a round figure, which has occasioned some country people giving it the title of Snow-ball-tree. This sort is cultivated in gardens for the beauty of its flowers, which make a fine appearance during their continuance.

It will rise to the height of eighteen or twenty feet, if it is permitted to stand. The stem becomes large, woody, and hard; the branches come out opposite, and are apt to grow irregular; they have a gray bark. The leaves are placed opposite; they are divided into three or four lobes, somewhat like those of the Maple: they are about three inches long, and two and a half

half broad, jagged on their edges, and of a light green colour. The flowers come out at the end of the branches; those of the first in large umbels, and those of the second in a corymbus; they are very white, and appear the beginning of June; those of the first have oval berries succeeding the hermaphrodite flowers, which turn of a scarlet colour when ripe, but the other, having only male flowers, are barren.

The eighth sort grows naturally in Carolina, and some other parts of North America; this rises with a shrubby stalk eight or ten feet high, sending out many side branches, which are covered with a smooth purple bark, and garnished with heart-shaped oval leaves ending in acute points; they are deeply sawed on their edges, have many strong veins, and stand upon very long slender foot-stalks opposite. The flowers are collected into large umbels at the end of the branches; those ranged on the border are male and barren, but the middle is composed of hermaphrodite flowers, which are succeeded by oval berries. The flowers are white, and the berries are red when ripe.

The ninth sort grows naturally in South Carolina; this has a shrubby stalk which rises twelve or fourteen feet high, sending out branches from the root upward; these are garnished with oval leaves about one inch long, and more than half an inch broad, of a light green colour, placed opposite on short foot-stalks; the flowers spring from the wings of the leaves upon very short foot-stalks, supporting small umbels of white flowers, which appear in July, but are rarely succeeded by seeds in England.

The first sort may be propagated either from seeds, or by laying down the tender branches, but the former method being tedious, is seldom practised, because the seeds seldom grow the first year, unless they are sown in autumn; and as the branches easily put out roots, that is the more expeditious method.

The best time for laying these branches is in autumn, just as the leaves begin to fall; (the manner of laying them being the same as for other hardy trees, need not be here repeated.) By the succeeding autumn the layers will be rooted, when you may take them off from the old plants, and transplant them into a nursery for two or three years, in which they may be trained up to regular stems and heads, and may afterward be planted where they are to remain. This sort is very hardy.

The striped sort may be propagated by inarching or budding it upon the plain sort; this is preserved by such as delight in variegated plants, but there is no great beauty in it. The trees seldom grow near so large as those of the plain sort, as is the case of all other striped plants.

The third sort is generally propagated by layers here, because the seeds do not ripen in England. The young shoots of this take root very freely; the cuttings will also take root, if they are planted in autumn; the seeds, when they are brought to England, always remain in the ground a year like those of the other sorts, so that the propagating the plants by seeds is a tedious method.

The *Laurustinus* are propagated by laying down their young branches, which put out roots very freely, so that when they are layed in autumn, they will be well rooted by that time twelve months, when they should be taken off from the old plants, and may either be planted where they are to remain, or into a nursery to grow two years to get strength. The best season to transplant these is at Michaelmas, when they may get new root before winter; for as these plants begin to flower early in winter, it is a plain indication of their growing at that season; for they will more surely succeed then, than at any other time of the year; though they may be removed in the spring with balls of earth to their roots, provided it is done before they begin to shoot; they may also be removed the latter end of July or the beginning of August, if rain happens at that time; for after they have done shooting, which is soon after Midsummer, they will be in

no danger, provided they are not kept out of the ground any time.

These plants may also be propagated by seeds, which should be mixed with earth in autumn, soon after they are ripe; these should be exposed to the open air, and receive the rain in winter, and in the spring they may be sown upon a gentle hot-bed, which will bring up the plants; these should remain in the bed till autumn, and then may be transplanted, and treated in the same way as the layers. I have raised many of these plants from seeds, which I find hardier than those raised by layers.

Some people train up the *Laurustinus* with naked stems to have round heads; but if these are planted in the open air, they will be in more danger of suffering by severe frost, than those whose branches grow rude from the bottom; for if the frost kills the outer part of the shoots, the stems will be protected, so will soon put out new branches; but where the stems are naked, the frost frequently kills them to the root.

The seventh sort may be propagated in the same way as the *Laurustinus*, and requires the same treatment; it loves a soft loamy soil, and should have a sheltered situation.

The eighth sort is easily propagated by layers or cuttings. The common Guelder-rose sends out plenty of suckers from the roots, by which it is frequently propagated; but as the plants so raised are very subject to put out suckers, they are not so good as those which come from layers or cuttings. This sort loves a moist soil, in which it will make much greater progress, and produce flowers in greater plenty than on a dry soil.

The ninth sort is tender while young, so requires to be sheltered under a common frame in winter, till the plants have obtained good strength; when, if they are planted against a good aspected wall, they will resist the cold of our ordinary winters very well, and make good progress; but as they are liable to be killed by severe cold, so it will be proper to keep a couple of plants in pots, to be sheltered in winter. This may be propagated by laying down of the branches, which will take root in one year.

VICIA. Tourn. Inst. R. H. 396. tab. 221. Lin. Gen. Plant. 782. [so called of vincio, *Lat.* to bind, because it clings about any props or supporters.] Vetch; in French, *Vesse*.

The CHARACTERS are,

The flower has an erect tubulous empalement of one leaf, cut into five equal parts at the brim; the petal is of the butterfly kind; the standard is oval, broad at the tail, indented at the point, and the borders are reflexed; the two wings are almost heart-shaped, and are shorter than the standard; the keel is shorter than the wings; the tail is oblong, and divided into two parts. It has ten stamina, nine joined, and one separated, terminated by erect summits with four furrows, and a linear, compressed, long germen, supporting a slender style crowned by an obtuse stigma, which is bearded on the under side. The germen afterward turns to a long pod, with one cell opening with two valves, and ending with an acute point, containing several roundish seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which contains those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. VICIA (*Cracca*) pedunculis multifloris, floribus imbricatis, foliolis lanceolatis pubescentibus, stipulis integris. Lin. Sp. 1035. *Vetch with many imbricated flowers on each foot-stalk, the lobes of the leaves spear-shaped, and entire stipula.* Vicia multiflora. C. B. P. 345. *Tufted Vetch.*
2. VICIA (*Sylvatica*) pedunculis multifloris, foliolis ovalibus, stipulis denticulatis. Lin. Sp. Plant. 734. *Vetch with foot-stalks supporting many flowers, oval lobes to the leaves, and indented stipule.* Vicia sylvatica, multiflora, maxima. Ph. Britt. *The largest many-flowered Wood Vetch.*

3. *Vicia* (*Cassubica*) pedunculis subsexfloris, foliolis denis ovatis acutis, stipulis integris. Lin. Sp. Plant. 735. *Vetch with foot-stalks having about six flowers, leaves with ten oval acute lobes, and entire stipule.* *Vicia multiflora Cassubica frutescens, filiquâ lentis.* Breyn. Prod. 52. *Many-flowered shrubby Vetch of Cassubia, with a Lentil pod.*
4. *Vicia* (*Biennis*) pedunculis multifloris, petiolis sulcatis, sub-dodecaphyllis, foliolis lanceolatis glabris. Lin. Sp. Plant. 736. *Many-flowered Vetch with furrowed foot-stalks, and for the most part twelve spear-shaped smooth lobes to each leaf.*
5. *Vicia* (*Sativa*) leguminibus sessilibus subbinatis erectis foliis retusis, stipulis notatis. Lin. Sp. Plant. 736. *Vetch with erect pods growing by pairs, and sitting close to the stalks, blunt lobes to the leaves, and spotted stipule.* *Vicia sativa vulgaris semine nigro.* C. B. P. 344. *Common cultivated Vetch with a black seed, frequently called Tares.*

There are many more species of this genus than are here enumerated, some of which grow naturally in England, but as they are rarely cultivated, except in botanic gardens for the sake of variety, they are omitted, as they are plants of little use or beauty.

The first sort here mentioned grows naturally among bushes, and by the sides of woods in most parts of England. The root is perennial, but the stalks are annual; these are weak, requiring support; they rise five or six feet high, fastening their tendrils, which grow at the end of their leaves, to the bushes or hedges, whereby they climb; they are hairy, as are also the leaves, which are composed of about ten pair of spear-shaped lobes terminated by a tendril. The flowers stand upon long foot-stalks which spring from the wings of the stalk; the spikes are long; the flowers lie one over the other; they are of a fine blue colour, so make a pretty appearance when they come out from between the bushes or shrubs which support them; they appear in July, and are succeeded by compressed pods filled with round seeds, which ripen in autumn.

The second sort grows naturally in the woods near Bath and Bristol; this hath a perennial root. The stalks are weak, and climb by the help of their tendrils over the neighbouring bushes and hedges, rising to the height of seven or eight feet. The leaves are composed of seven or eight pair of oval smooth lobes, terminated by tendrils. The flowers are produced in long spikes from the wings of the stalks; they are of a pale blue colour, and are larger than those of the former sort; they appear in July, and are succeeded by short smooth pods, filled with round seeds which ripen in autumn.

The third sort grows naturally in Cassubia; this has a ligneous creeping root; the stalks trail upon the ground; they grow three feet long, and their lower part become more ligneous toward autumn, but they die to the root in winter. The leaves are composed of ten pair of oval acute-pointed lobes. The flowers come out from the wings of the stalk; they are disposed in short spikes, each containing, for the most part, six pale blue flowers which appear in July, and are succeeded by short smooth pods like those of Lentils, including three or four round seeds which ripen in autumn.

These sorts have been recommended to be sown in the fields for fodder for cattle, but as their stalks are slender, and less succulent than those of the common Vetch, so it is doubtful if these will answer the purpose of farmers to cultivate them; for as their stalks trail to a great length, so if they have not support, they will be subject to rot by lying upon the ground; and although their roots are perennial, yet as it is late in the spring before they shoot to a height sufficient to cut for use, so there is little want of green feed for cattle at that time.

However, a few of these plants may be allowed a place in large gardens for the sake of variety, where, if they are properly placed, they may be ornamental, particularly on the borders of wood-walks, or in thickets of shrubs. If some of the first sort are allowed to climb

up upon their branches, they will have a good effect during their continuance in flower.

These sorts are propagated by seeds, which should be sown in autumn soon after they are ripe, for if they are kept out of the ground till spring, the seeds often fail, or at least remain in the ground a year before they vegetate; they should be sown in the places where the plants are designed to remain, for they do not bear transplanting well. These plants grow naturally in woods and thickets of bushes, where their roots are screened from the sun, and their stalks furnished with supports by the bushes, point out the places where the seeds should be sown, which should be where they are sheltered by shrubs. If three or four seeds are sown on each patch, it will be sufficient, for if one or two plants come up in each place it will be enough. When the plants come up, they will require no other culture but to keep them clean from weeds, and their stalks must be permitted to climb upon the neighbouring shrubs; for if they trail upon the ground, they will produce few flowers, and in wet seasons the stalks will rot, so the plants will be rather unsightly.

The fourth sort grows naturally in Siberia; this is a biennial plant, which promises fairly to become a useful one for fodder; for the stalks of this grow to a great length, and are well furnished with leaves. These do not decay in autumn, but continue green through the winters in defiance of the most severe frost; so that in February and March, when there is often a scarcity of green feed for ewes and lambs, this may be of great service.

The stalks of this rise five or six feet high. The leaves are composed of five or six pair of smooth spear-shaped lobes, terminated by tendrils. The foot-stalks are deeply furrowed. The flowers are produced in spikes upon long foot-stalks, which spring from the wings of the stalks; they are of a light blue colour, and appear in July; these are succeeded by short compressed pods, containing three or four round seeds which ripen in autumn.

This sort is propagated by seeds, which may be sown in the spring or autumn; and when the plants come up, they will require no other culture but to keep them clean from weeds; and if they are supported from trailing upon the ground, they will continue in verdure all the winter, and the following summer they will flower and produce ripe seeds.

If this plant is designed for feed, the seeds should be sown in rows at four feet distance, and should be dropped thin in the rows; for as the stalks send out many branches, and extend to a great length, so when the plants are too close, the branches will intermix, and mat so closely together, as to rot each other by excluding the air. When the plants come up, they must be kept clean from weeds, which, while they are young, should be performed with Dutch hoes, but afterward it may be done by the hoeing plough, which will save expence, and with this instrument the plants may be earthed up in the same manner as Peas and Beans, which will greatly strengthen their stalks, and make them and the leaves larger and more succulent, so increase the quantity of feed. If this is practised as often as may be found necessary to destroy the weeds in summer, it will prepare the ground for any crop which may afterward be put upon the land; and as this will be in no danger of suffering from frost, so it should be preserved till the spring, when there is a want of green feed for ewes, at which time it may be cut as it is wanted; but a part of the plants should be permitted to stand for seeds, for those which are cut, if they do shoot again, will flower so late in summer, that unless the autumn proves very warm, the seeds will not ripen; therefore it will be a better way to sow a sufficient quantity of seeds for this purpose in a separate spot of ground, because, when the other is cut, the ground may be ploughed for other crops; and if in mild seasons there may be so great plenty of other green feed as not to want this, if the plants are ploughed into the ground, it will be a good dressing for other crops.

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This is what I am now beginning to try in the field, where I have not as yet had experience of its culture; but what I have here advised, is founded upon experiments which I have for six years made upon small patches of it sown in gardens, in different situations. In all these patches I have found the plants continue in great verdure, when most of the perennial plants in the same situation have suffered greatly by the frost; and from eight of these plants I could have cut as much feed, as would have been equivalent to half a truss of green Clover.

The fifth sort is the common Vetch or Tare, which is much cultivated in the fields for fodder; of this there are two varieties, if not distinct species. The first, which is the most common, has a black seed; the other has seeds as white, if not whiter than the whitest Peas; and this difference is permanent, for I have sown both sorts many years, and have never found either of them vary. These plants are annual, and perish soon after they have perfected their seeds. The stalks are angular, streaked, and hairy; they are weak and want support, so generally decline where they have nothing near to fasten themselves to. The leaves are composed of several pair of blunt lobes, and are terminated by tendrils. The flowers come out from the wings of the stalk, sitting very close to the base of the foot-stalks of the leaves; two of these generally spring from the same joint; they are pretty large, and of the butterfly shape; they are purple: these appear in June and July, and are succeeded by erect pods, containing three or four round seeds in each, which ripen in August and September.

The sort with white seeds is rather the more succulent plant of the two, so is better for fodder; but many people refuse to cultivate them, because they say the seeds being white, are much sooner found out by the rooks, than those which are nearer the colour of the ground, so are often devoured soon after they are sown, especially where any of the seeds are not buried; but if the seeds are sown in drills, they may be so carefully covered, as that the birds will not easily find them.

There is another kind of Vetch which is cultivated in the fields, with a smaller black seed; this is called in some counties Rath ripe Vetch, and in others Pebble, or Summer Vetch; but this being much tenderer than the common Vetch is seldom cultivated, for this must always be sown in the spring, and will ripen its seeds the same summer, but it will not afford near so good fodder as the other.

Vetches are generally sown at two seasons, one is in autumn, and the other early in the spring; but the best time is in August, for the seeds which are sown then will come up soon, and the plants will have time to get strength before winter, so will be in less danger of suffering by frost than those which are sown later, and will be fit to cut for feed much earlier in the spring, for it is then green feed is most wanted; and if they are designed for seed and not to be cut for fodder, those early-sown Vetches will come early into flower, and the seeds will be ripe early, so they may be cut and stacked in good weather; which is a great advantage, for those which ripen late are often stacked or housed wet, and then the seeds frequently sprout in the mow and are spoiled.

The usual method of sowing Vetches is in broad-cast, ploughing them lightly in; in this way the common allowance of seeds for one acre of land is two bushels, but there are some who sow two bushels and a half; this practice may do well enough for those Vetches which are designed to be cut for fodder in the spring, but those which are sown with an intent to stand for seeds, will do much better if they are sown in drills in the same way as is practised for Peas, and then less than half the quantity of seeds will be sufficient; for the drills should not be nearer to each other than three feet, that the hoe plough may have room to go between them, to destroy the weeds, and earth up the plants; for by this management they will produce a much greater crop, and ripen earlier in the season.

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These drills should be about the same depth as those usually made for Peas, and the seeds should be scattered about the same distance in the drills. These seeds should be carefully covered as soon as they are sown, for if they are left open the rooks will discover them; and when they once find the rows, if they are not carefully watched, they will entirely devour them. Indeed, these being sown early in autumn, will be in less danger than those which are sown late, or in the spring, because there is more food for rooks and pigeons in the open fields at this season, and the plants will appear much sooner above ground. The best time to sow them is about the beginning of August, for the rains which usually fall about that season, will bring them up in a short time. Toward the latter end of October the plants will have obtained considerable strength, therefore they should be earthed up with the hoeing plough. This work should be performed in dry weather, and in doing it care must be had to lay the earth up as high to the stems of the plants as possible, so as not to cover their tops, because this will secure them against frost. The whole space of ground between the rows should also be stirred, in order to destroy the weeds, which, if carefully performed in dry weather, will lay the land clean till March; at which time the crop should be earthed a second time, and the ground cleaned again between the rows, which will cause the plants to grow vigorous, and in a little time they will spread so as to meet, and cover the spaces; whereas those sown in the spring will not grow to half this size, and will be very late in flowering.

Some people sow these Vetches, and when they are fully grown, plough them into the ground to manure it. Where this is designed, there will be no occasion to sow them in drills at this distance, nor to husband them in the manner before directed; but in this case it will be the best method to sow them in autumn, because they will be fit to plough in much sooner the following year, so that the land may be better prepared to receive the crops for which it is intended. In some parts of France, and in Italy, these Vetches are sown for feeding of cattle while green, and are accounted very profitable; and in many parts of England they are cultivated to feed cart-horses, &c. though upon such land where Lucern will thrive, it will be much better husbandry to cultivate that for this purpose.

Where these plants are cultivated for their seeds, they should be cut soon after the pods change brown; and when they are dry, they must be immediately stacked, for if they are suffered to lie out in the field to receive wet, and there comes one hot day after it, the pods will most of them burst, and cast out the seeds. When the seeds are threshed out, the haulm is esteemed very good food for cattle, and some have recommended the seeds for horses, and affirm they are as proper for those animals as Beans; which, if true, will render them more valuable, because these will grow on the lightest sandy land where Beans will not thrive, so may be a good improvement to some counties in England, where they do not attempt to cultivate Beans.

VINCA. Lin. Gen. Plant. 261. Pervinca. Tourn. Inst. R. H. 119. tab. 45. Periwinkle; in French, *Pervenche*.

The CHARACTERS are,

The empalement of the flower is permanent, and cut into five acute parts at the top. The flower has one salver-shaped petal, whose tube is longer than the empalement. The brim is broad, spreading open, and slightly cut into five obtuse segments; it has five very short inflexed stamina, terminated by erect, obtuse, membranaceous summits, and two roundish germen, which have two roundish corpuscles on their side, supporting one common style the length of the stamina, crowned by two stigmas; the under is orbicular and plain, the upper is concave and beaded. The germen afterward turns to a fruit composed of two taper acute-pointed husks, opening lengthways with one valve, and filled with oblong cylindrical seeds.

This

This genus of plants is ranged in the first section of Linnæus's fifth class, which includes those plants whose flowers have five stamina and one style.

The SPECIES are,

1. VINCA (*Minor*) caulibus procumbentibus, foliis lanceolato-ovatis, floribus pedunculatis. Lin. Sp. Plant. 209. *Periwinkle with trailing stalks, and oval spear-shaped leaves.* Pervinca vulgaris, angustifolia, flore cæruleo. Tourn. Inst. 120. *Common narrow-leaved Periwinkle, with a blue flower.*
2. VINCA (*Major*) caulibus erectis, foliis ovatis, floribus pedunculatis. Lin. Sp. Plant. 209. *Periwinkle with erect stalks and oval leaves.* Pervinca vulgaris, latifolia, flore cæruleo. Tourn. Inst. 119. *Common broad-leaved Periwinkle with a blue flower.*
3. VINCA (*Rosea*) foliis oblongo-ovatis integerrimis, tubo floris longissimo, caule ramoso fruticoso. Tab. 186. *Periwinkle with oblong, oval, entire leaves, a very long tube to the flower, and a shrubby branching stalk.*

The first sort grows naturally under hedges and bushes in many parts of England. The stalks are slender, and trail upon the ground, emitting fibres from their joints, which take root, whereby the plant multiplies and spreads greatly. The leaves are placed opposite on their stalks; they are oval, spear-shaped, about an inch and a half long, and three quarters of an inch broad, of a thick consistence, very smooth, and entire; the upper side is of a deep lucid green, and their under side of a bright green colour; they stand upon short foot-stalks. The flowers stand singly upon foot-stalks, which spring from the wings of the stalks; they are nearly of a funnel-shape, but spread more at their brim, which is almost flat like a salver; their brim is divided into five broad obtuse segments: the most common colour of the flower is blue, but it is often found with a white flower, and sometimes the flowers are variegated with both colours. These flowers begin to appear in April, and there is often a succession of them continued great part of summer. The flowers are very rarely succeeded by seeds. Tournefort says he was at a loss for the fruit of this plant, to engrave the figure of it in his Elements of Botany, which he obtained by planting some plants in small pots to confine their roots, and prevent their stalks from trailing upon the ground. This experiment I tried several years without success, but I afterward planted three or four plants in the full ground, and constantly cut off their lateral shoots, leaving only the upper stalks, and these plants the second year produced plenty of the pods.

There are two varieties of this plant with variegated leaves; one has white, and the other yellow stripes; these are by some preserved in their gardens for the sake of variety. There is also one with double purple flowers, which I believe to be only an accidental variation, therefore have not enumerated it here.

The second sort is also found growing naturally in several parts of England. The stalks of this are larger than those of the former, and do not trail so close to the ground; they rise two feet high, but their tops decline again to the ground, and often put out roots when they are suffered to lie on the ground. The leaves of this sort are oval, heart-shaped, about three inches long, and two broad; they stand opposite upon thick foot-stalks; their upper surface is of a lucid green, their under is of a lighter green colour; they are of a thick consistence and entire. The flowers come out from the wings of the stalk in like manner as the former, and are of the same shape, but much larger. Their usual colour is blue, but they are sometimes seen with white flowers. This sort flowers earlier in the spring than the former, and there is a succession of them great part of summer.

As these plants delight to grow under the cover of trees and bushes, so they may be made ornamental in large gardens, if they are planted on the verges of wildernesses, where they will spread and cover the ground: and as their leaves continue green all the year, they will have a good effect in winter, and their flow-

ers appearing great part of summer, will add to the variety.

They are easily propagated by their trailing stalks, which put out roots very freely, especially those of the first sort; and if the stalks of the large sort are laid in the ground, they will root very soon, and may be cut off and transplanted where they are to remain, and when they are once rooted, they will spread and multiply very fast without farther care. The first sort is used in medicine, and is esteemed a good vulnerary plant.

The third sort grows naturally in the island of Madagascar, from whence the seeds were brought to the Royal Garden at Paris, where the plants were first raised, and produced their flowers the following summer; from these plants good seeds were obtained, part of which was sent me by Mr. Richard, gardener to the King at Versailles and Trianon. These succeeded in the Chelsea Garden, where many plants were raised. It rises with an upright branching stalk to the height of three or four feet, which when young are succulent, jointed, and of a purple colour; but as the plants advance, their lower parts become ligneous. The branches which come out from the side, have their joints very close; they have a smooth purple bark, and are garnished with oblong, oval, entire leaves, two inches and a half long, and one and a half broad; they are smooth and succulent, sitting pretty close to the branches. The flowers come out from the wings of the branches singly, standing upon very short foot-stalks; their tube is long and slender; their brim spreads open flat, which is divided into five broad obtuse segments, which are reflexed at their points. The upper surface of the petal is of a bright crimson or Peach colour, and their under side is of a pale flesh colour. There is a succession of these flowers upon the same plant, from February to the end of October. Those flowers which appear early in the summer, are succeeded by taper seed-vessels, filled with roundish black seeds, which ripen in autumn.

This sort is propagated by seeds or cuttings; those plants which arise from seeds grow more upright, and do not branch so much as the plants which are propagated by cuttings. The seeds of this should be sown upon a moderate hot-bed in the spring, and when the plants come up, and are fit to remove, they should be transplanted on a fresh hot-bed at about four inches distance, shading them from the sun till they have taken new root; then they must be treated in the same way as other young tender plants which are natives of warm countries; but there must be great care had to prevent their drawing up weak, nor should they have water in too great plenty. When the plants have obtained strength, they should be carefully taken up with balls of earth to their roots, and planted in pots filled with good earth, and plunged into a moderate hot-bed to facilitate their taking new root, observing to screen them from the sun, and when they are well rooted in the pots, they must be gradually hardened to bear the open air; but unless the summer proves warm, these plants should not be placed in the open air, for they will not thrive if they are exposed to cold or wet; therefore during the summer they should be placed in an airy glass-case, and in winter they must be removed into the stove, where the air is kept to a temperate heat, without which they will not live through the winter in England.

If these plants are propagated by cuttings, they should be planted in pots during any of the summer months. The pots should be plunged into a moderate hot-bed, and if they are closely covered with bell or hand-glasses, it will cause them to put out roots sooner than they otherwise would do; when these have put out roots, they must be gradually hardened, and afterward planted in pots, and treated in the same way as the seedling plants.

This plant deserves a place in the stove, as much as any of the exotic plants we have in England, because

V I O

the flowers are very beautiful, and there is a constant succession of them all the summer.

VINCITOXICUM. See ASCLEPIAS.

VINE. See VITIS.

VIOLA. Tourn. Inst. R. H. 419. tab. 236. Lin. Gen. Plant. 898. Violet.

The CHARACTERS are,

The flower has a short permanent empalement of five leaves, which are differently ranged in the different species. The flower is of the ringent kind, and is composed of five unequal petals; the upper is broad, obtuse, and indented at the point, having a horned nectarium at the base; two side petals are opposite, the two lower are larger, rising and reflexed; it has five small stamina, which are annexed as appendages to the entrance of the nectarium, terminated by obtuse summits, which are sometimes connected, and a roundish germen supporting a slender style which stands out beyond the summits, and is crowned by an oblique stigma. The germen afterward turns to an oval three-cornered capsule with one cell, opening with three valves, including many oval seeds.

This genus of plants is ranged in the fifth section of Linnæus's nineteenth class, which includes those plants whose flowers are single in the empalements, but have their summits connected.

The SPECIES are,

1. VIOLA (*Odorata*) acaulis, foliis cordatis, stolonibus reptantibus. Lin. Sp. Plant. 934. *Violet having no stalks, heart-shaped leaves, and creeping shoots. Viola martia purpurea, flore simplici odoro. C. B. P. 199. Purple March Violet, with a single sweet flower.*
2. VIOLA (*Hirta*) acaulis, foliis cordatis piloso-hispidis. Flor. Suec. 718. *Violet without a stalk, having heart-shaped leaves with stinging hairs. Viola martia hirsuta inodora. Mor. Hist. 2. p. 475. Hairy, scentless, March Violet.*
3. VIOLA (*Palustris*) acaulis, foliis reniformibus. Haller. Helvet. 501. *Violet without a stalk, having kidney-shaped leaves. Viola palustris rotundifolia, glabra. Mor. Hist. 1. p. 475. March Violet with round smooth leaves.*
4. VIOLA (*Mirabilis*) caule triquetro, foliis reniformi-cordatis, floribus caulinis apetalis. Lin. Sp. 1326. *Violet with a three-cornered stalk, kidney heart-shaped leaves, and flowers whose petals are fastened to the stalks. Viola montana latifolia, flores e radice, femina in cacumine ferens. Hort. Elth. 408. tab. 303. Mountain Violet with a broad leaf, whose flowers and seeds join to the roots.*
5. VIOLA (*Multifida*) acaulis, foliis pedatis septenpartitis. Lin. Sp. Plant. 933. *Violet without a stalk, and leaves growing like feet, divided into seven parts. Viola Virginiana tricolor, foliis multifidis, cauliculo aphylo. Pluk. Alm. 388. Three-coloured Virginia Violet, with many-pointed leaves, and a naked stalk.*
6. VIOLA (*Pinnata*) acaulis, foliis pinnatifidis. Lin. Sp. Plant. 734. *Violet without a stalk, and leaves having many points. Viola Alpina, folio in plures partes dissecto. C. B. P. 199. Alpine Violet, with a leaf cut into many parts.*
7. VIOLA (*Cenisia*) acaulis, grandiflora, foliis ovalibus uniformibus integerrimis. Allion. *Violet without a stalk, having a large flower, and oval entire leaves which are uniform.*
8. VIOLA (*Montana*) caulibus erectis, foliis cordatis oblongis. Lin. Sp. Plant. 935. *Violet with erect stalks, and oblong heart-shaped leaves. Viola martia arborefcens purpurea. C. B. P. 199. Tree-like purple March Violet.*
9. VIOLA (*Tricolor*) caule triquetro diffuso, foliis oblongis dentatis, stipulis dentatis. Flor. Suec. 721. *Violet with a three-cornered diffused stalk, oblong indented leaves, and indented stipule. Viola tricolor hortensis repens. C. B. P. 199. Creeping three-coloured Garden Violet, commonly called Heart's-ease or Pansies.*
10. VIOLA (*Calcarata*) caule diffuso decumbente, foliis oblongis incis, stolonibus reptatricibus. *Violet with a diffused trailing stalk, oblong cut leaves, and creeping shoots. Viola montana, lutea grandiflora. C. B. P. 200. Yellow Mountain Violet with a large flower.*

V I O

The first sort, which is the common sweet Violet, grows naturally under hedges in the neighbourhood of London; but in several of the distant counties, the Violet without scent is the most frequent. Of the common Violet there are the following varieties; the single blue and white, the double blue and white, and the pale purple. These are all of them commonly preserved in gardens for the odour of their flowers; this has a thick fibrous root, sending forth long trailing shoots, which put out fibres, and take root in the ground, whereby it spreads and propagates. The leaves grow upon pretty long foot-stalks; they are heart-shaped, and somewhat hairy. The flowers stand upon slender naked foot-stalks, which arise immediately from the heads of the plants; they are of an irregular figure, in some resembling the snout of an animal, composed of five unequal petals, one of which has a heel, or horned nectarium at the base. These flowers generally appear in March, from whence they had the appellation of March Violets. After the flowers are past, the germen swells to a roundish capsule with three furrows, having one cell, in which are lodged four or five round seeds which ripen in July.

The flowers of this sort are one of the four cordial flowers; they are esteemed cooling, moistening, and laxative. The leaves of the plants are sometimes used in clysters; but the flowers of the second sort have been frequently brought to the markets, and sold for this, which have no scent, so are unfit for the purposes intended, but being larger they fill the measure sooner.

The second sort is found growing naturally in many parts of England. The leaves of this sort are larger, and are covered with rough stinging hairs. The flowers are larger and have no scent, which are the only differences.

The third sort grows naturally in marshes and on bogs in several parts of England. The leaves of this are small, kidney-shaped, and smooth. The flowers are small, and of a pale blue colour; they appear in June, and are succeeded by small oblong capsules filled with roundish seed.

The fourth sort grows naturally in Germany and Sweden; it is preserved in some curious gardens for variety. The leaves of this are spear-shaped and entire, standing upon foot-stalks. The flowers are larger than those of the common sort, but have no scent.

The fifth sort is a native of North America. The leaves of this are divided into seven parts or lobes, which are united at the foot-stalk. The flowers stand upon naked foot-stalks; they are of the Pansy kind, and have no scent; they appear in June, but are not succeeded by seeds here.

The sixth sort grows naturally on the Alps; this was sent me by Dr. Allione from Turin; it is a very low plant, seldom rising two inches high. The leaves are small, and cut into wing points; the flowers are of a pale blue colour, and appear in June.

The seventh sort was sent me by the same gentleman, who found it growing on the Alps; this is an humble plant, with oval, entire, uniform leaves, not more than half an inch long, and a quarter broad, standing upon short foot-stalks. The flowers are large, of a light blue colour, and appear in June. These have no scent.

The eighth sort grows naturally on the Alps, and the mountains in Austria. The root of this is perennial, but the stalks and leaves decay in autumn; this has erect stalks which rise more than a foot high; they are garnished with oblong heart-shaped leaves. The flowers stand upon long foot stalks, which spring from the wings of the stalks; they are shaped like those of the Dog Violet, and are of a pale blue colour; these appear the end of May, and are succeeded by roundish capsules filled with small seeds, which ripen in August.

The ninth sort is the Heart's-ease or Pansies, which grows naturally in some of the northern counties of England, but is generally cultivated in gardens. Of

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this there are many varieties, which differ greatly in the size and colour of their flowers. Some of these varieties have very large beautiful flowers, which have an agreeable odour; others have small flowers without scent; whether these are distinct species or accidental varieties, I have not been able to determine, for I have saved the seeds of most of the varieties as carefully as possible, and have sown them separate, but have always had a mixture arise, which may have come from seeds lying in the ground; for in gardens where these plants have been permitted to scatter their seeds, it is impossible to know how long the seeds may lie in the ground; and when they are turned up to the surface, they will grow, which renders it difficult to determine the specific differences of these plants in such places.

This is an annual plant, whose roots decay after they have flowered and perfected their seeds. The lower leaves are roundish or oblong, and are indented on their edges; the stalks rise seven or eight inches high, sending out many diffused branches; they are four-cornered, and are garnished with leaves which are longer and narrower than those below; these are notched on their edges, and sit close to the branches. The flowers stand upon long naked foot-stalks, which spring from the wings of the stalk; they are in shape like those of the common Violet. Some of the varieties have flowers much larger, and others are of the size of March Violets; some of them have the two upper petals of a deep yellow colour with a purple spot in each, the two middle of a paler yellow with a deep yellow spot, and the lower petal of a velvet colour; in others the petals are white, with yellow and purple spots; in some the yellow is the most prevailing colour, and in others the purple.

The tenth sort grows naturally upon mountains in the north of England, and in Wales; this is a perennial root, sending out shoots from the side, which spread and propagate, in which it differs from all the Pansies. The lower leaves are oblong and jagged; the stalks seldom rise more than four or five inches high; they decline at the bottom, and are garnished with narrower leaves than those below, which are deeper cut on their sides. The flowers stand upon naked foot-stalks two inches long; they are much larger than those of the common sort, and are of a deep yellow colour, with a few purple streaks in the center. This plant continues flowering great part of summer, but the flowers have no scent.

The common Violets are easily propagated by parting of their roots; this may be done at two seasons: the first or most common season for removing and parting of these roots is at Michaelmas, that the young plants may be well rooted before winter; this is generally practised where the plants are put on the borders of wood walks in large plantations, but in the gardens where they are cultivated for their flowers, the gardeners transplant and part their plants soon after their flowering season is over; so they gather all the flowers first, and the plants, which are then removed, will have all the remaining summer to grow and get strength, so will produce a greater quantity of flowers the following spring, than those which are removed in autumn; but this is not to be practised, where they cannot be supplied with water till they have taken new root, unless in moist seasons.

When these are planted, they should be placed at a good distance from each other to allow them room to spread, for if they are expected to produce many flowers, they should not be transplanted oftener than once in three or four years, so that in that time the offsets will spread over the ground, if the roots are three feet asunder.

Violets may also be propagated by seeds, which should be sown soon after they are ripe, which is about the end of August. The plants will come up the following spring, and when they are fit to remove, they should be transplanted in shady borders to grow till autumn, and then they may be planted where they are to remain, but the double-flowering Violets do

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not produce seeds. Although the white, blue, and purple Violets are generally supposed to be varieties which have accidentally sprung from seeds, yet I have several years sowed the seeds of all the three sorts, and have not found either of them vary.

The other sorts of Spring Violets are sometimes preserved in botanic gardens for the sake of variety; these may be propagated in the same way as the common sort, but require a moist soil and a shady situation.

The upright sort does not send out shoots like the common Violet, so increases but slowly by offsets; this may be propagated by seeds in plenty, and is as hardy as the common sort.

The several varieties of Pansies will scatter their seeds in a short time after the flowers are past, and from these self-sown seeds the plants which come up in autumn, will flower very early in the spring, and these will be succeeded by the spring plants; so that where they are indulged in a garden, and their seeds are permitted to scatter, there will be a constant succession of their flowers the greatest part of the year; for they will flower all the winter in mild seasons, and most part of the summer in shady situations, which renders them worthy of a place in every good garden; but then they must not be allowed to spread too far, lest they become troublesome weeds, for their seeds, when ripe, are cast out of their covers with great elasticity to a considerable distance, and the plants will soon spread over a large space of ground, if they are permitted to stand.

The common Pansy stands in the College Dispensatory as a medicinal plant, but is rarely used in England. The great yellow Violet propagates by offsets in pretty great plenty, if it has a moist soil and a shady situation; this may be transplanted in autumn, and the offsets may then be taken off, but the roots should not be divided into small heads; nor should they be too often transplanted, because they will not produce many flowers, unless the plants are strong, and have good root in the ground. This sort will not live in a dry soil, nor in a situation much exposed to the sun.

VIORNA. See CLEMATIS.

VIRGA AUREA. See SOLIDAGO.

VISCUM. Tourn. Inst. R. H. 609. tab. 380. Lin. Gen. Plant. 979. [so called, because its fruit is full of a glutinous substance.] Mistleto, in French, *Gui*.

The CHARACTERS are,

It has male and female flowers upon separate plants. The male flowers have an empalement composed of four oblong leaves; they have no petals, but have four summits, which are oblong and acute-pointed, each fastened to one of the leaves of the empalement. The female flowers have an empalement of four small oval leaves sitting upon the germen; these have no petals or stamina, but have an oblong three-cornered germen situated under the flower, having no style, but is crowned by an obtuse stigma. The germen afterward turns to a globular smooth berry with one cell, including a fleshy heart-shaped seed.

This genus of plants is ranged in the fourth section of Linnæus's twenty-second class, which contains those plants whose flowers have four male organs, and grow on separate plants from the fruit.

We have but one SPECIES of this genus in Europe, viz.

VISCUM (*Album*) foliis lanceolatis obtusis, caule dichotomo, spicis axillaribus. Lin. Sp. Plant. 1023. *Mistleto with blunt spear-shaped leaves, forked stalks, and spikes of flowers rising from the wings of the stalk.* Viscum baccis albis. C. B. P. 423. *Mistleto with white berries.* This plant, instead of rooting and growing in the earth like other plants, fixes itself, and takes root on the branches of trees; it spreads out with many branches, and forms a large bush. The branches are ligneous; they have a yellow green bark; the largest is about the thickness of a man's finger, the other are gradually smaller; they are full of joints which easily part asunder, at each of which grow two thick fleshy leaves, which are broad and rounded at their points,

points, and narrow at their base. The flowers come out from the wings of the stalk in short spikes; they have four yellow leaves, which are by some called petals, and others make them the empalement. The female flowers are succeeded by round white berries, which are almost pellucid, about the size of large white Currants, full of a tough viscid juice, in the middle of which lies one heart-shaped flat seed.

It grows upon the white Thorn, the Apple, the Crab, the Hazel, the Ash, and Maple, but is rarely found upon the Oak, though the Mistletoe of the last has been always accounted the best of all; which opinion, as Mr. Ray well observes, may be owing to the superstitious honour which the ancient Druids of this island gave to this Mistletoe, to whom nothing was more sacred.

This plant is always produced from seed, and is not to be cultivated in the earth, as most other plants, but will always grow upon trees; from whence the ancients accounted it a super-plant, most of whom thought it was an excrescence on the tree, without the seed being previously lodged there, which opinion is now generally confuted from a repeated number of experiments.

The manner of its being propagated is this, viz. The Mistletoe Thrush, which feeds upon the berries of this plant in winter, when it is ripe, doth often carry the seeds from tree to tree; for the viscid part of the berry, which immediately surrounds the seed, doth sometimes fasten it to the outward part of the bird's beak, which, to get disengaged of, he strikes his beak against the branches of a neighbouring tree, and thereby leaves the seed sticking by this viscid matter to the bark, which, if it lights upon a smooth part of the tree, will fasten itself thereto, and the following winter will put out and grow; and in the same manner it may be propagated by art, for if the berries, when full ripe, are rubbed upon the smooth part of the bark of a tree, they will adhere closely thereto, and, if not destroyed, will produce plants the following winter.

The trees which this plant doth most readily take upon, are the Apple, the Ash, the white Thorn, and other smooth-rind trees before-mentioned; but I have several times tried it upon the Oak without success, for the bark of that tree is of too close a texture to admit the seeds sticking thereto, which is also the reason it is so rarely found upon that tree; and notwithstanding the great encomiums which have been given to the Mistletoe of the Oak for its medicinal virtues, yet I cannot help thinking that it is equally good from whatever tree it be taken, nor is it possible to find this plant growing in any quantity upon the Oak; so that those persons who pretend to furnish the town with it for physical use, do but impose upon the world, for it is so rarely met with, that whenever a branch of an Oak-tree hath any of these plants growing upon it, it is cut off, and preserved by the curious in their collections of natural curiosities, and of these there are but few to be seen in England.

As to what some persons have asserted of the manner how it is propagated, from tree to tree, by the Mistletoe thrushes, which eat the berries, and void the seed in their dung upon the branches of trees, whereby the seeds are stuck thereon, and take root into the bark, and produce fresh plants, I can by no means agree to, since, if it were only this way propagated, it would always be found on the upper part or the sides of such branches, upon which the dung can only be supposed to lodge; whereas it is generally found upon the under side of the branches, where it is almost impossible for these birds to cast their dung; besides, I believe the stomachs of these birds are too powerful digesters to suffer any seeds to pass so entire through the intestines as to afterwards grow; but I shall leave this to such as have leisure to make observations in those places where this plant abounds, and shall add only a short account of the method used to

make birdlime, which may not be improper to insert in this place for the satisfaction of the curious.

The Italians make their birdlime of the berries of Mistletoe heated and mixed with oil, as is that made of Holly bark, and to make it bear the water, they add turpentine.

Of the berries of this plant birdlime was formerly made in England. This was done by boiling the berries in water till they burst, when they were well beaten in a mortar, and afterward washed till all the branny husks were cleared away.

That which is now commonly used with us is made of the bark of Holly, which is stripped off about Midsummer; this they boil for ten or twelve hours, and when the green coat is separated from the other, they cover it up with Fern for a fortnight, and put it in a moist place, where it lies a fortnight, by which time the bark will be turned to a jelly, and no fibres of the wood be left; then they beat it in a stone mortar till it becomes a tough paste; this they wash in a running stream till no motes appear, and put it up to ferment for four or five days, and scum it as often as any thing arises, and then lay it up for use. When they use it, they incorporate with it a third part of that oil over the fire.

The birdlime that is brought from Damascus is supposed to be made of Sebestens, their kernels being frequently found in it, but this will not endure either frost or wet.

The birdlime brought from Spain is of an ill smell.

The bark of our Wayfaring Shrub, as it is said, will make birdlime as good as the best.

V I S N A G A. See DAUCUS.

V I T E X. Tourn. Inst. R. H. 603. tab. 373. Lin. Gen. Plant. 708. [so called of vico, Lat. to bend, because its branches are very flexible; it is also called Agnus Castus, because it is believed to allay lust, for which the monks were wont to use it in their cloisters; but by the taste and smell it should rather be a provocative.] Agnus Castus, or the Chaste-tree.

The CHARACTERS are,

The empalement of the flower is short, cylindrical, and indented in five parts. The flower has one ringent petal, with a slender cylindrical tube; the brim is plain, and divided into two lips; the two lips are trifid; the middle segment is the broadest in both. It has four hair-like stamina which are a little longer than the tube, two being shorter than the other, terminated by moveable summits, and a roundish germen, supporting a slender style, crowned by two awl-shaped spreading stigmas. The germen afterward turns to a globular berry with four cells, each containing one oval seed.

This genus of plants is ranged in the second section of Linnæus's fourteenth class, which contains those plants whose flowers have two long and two shorter stamina, and the seeds are included in capsules.

The SPECIES are,

1. VITEX (*Agnus Castus*) foliis digitatis, spicis verticillatis. Lin. Sp. Plant. 938. *Chaste-tree with fingered leaves, and whorled spikes of flowers.* Vitex foliis angustioribus cannabis modo dispositis. C. B. P. 475. *Chaste-tree with narrow leaves disposed like those of Hemp, or common Chaste-tree.*
2. VITEX (*Latifolia*) foliis digitatis serratis, spicis paniculatis. *Chaste-tree with fingered sawed leaves, and spikes in panicles.* Vitex folio latiore serrato. Lob. Icon. 139. *Chaste-tree with a broader sawed leaf.*
3. VITEX (*Integerrimis*) foliis ternatis quinatisve integerrimis, paniculis dichotomis. Lin. Sp. Plant. 890. *Chaste-tree with trifoliate and quinate leaves, and panicles of flowers rising from the division of the branches.* Vitex trifolia minor Indica. Pluk. Alm. 390. *Smaller Indian trifoliate Chaste-tree.*
4. VITEX (*Negunda*) foliis quinatis ternatisque serratis, spicis alaribus terminalibusque. *Chaste-tree with quinate and trifoliate sawed leaves, and spikes of flowers from the wings terminating the branches.*
5. VITEX (*Chinensis*) foliis ternatis quinatisque pinnato-incisis, spicis verticillatis terminalibus. *Chaste-tree with alternatis*

ternate and quinate leaves which are cut like wings, and whorled spikes of flowers terminating the branches.

The first fort grows naturally in Sicily, and near Naples, by the sides of rivers and in moist places; it has a shrubby stalk eight or ten feet high, sending out branches opposite the whole length, which are angular, pliable, and have a grayish bark; these are garnished with leaves for the most part placed opposite, upon pretty long foot-stalks; they are composed of five, six, or seven lobes which unite at the foot-stalk, and spread out like the fingers of a hand; the lower are small, and the middle are largest; they are smooth and entire; the largest are about three inches long, and half an inch broad in the middle, ending in blunt points, of a dark green on their upper side, but hoary on their under. The flowers are produced in spikes at the extremity of the branches; the spikes are from seven to fifteen inches long; these are disposed in whorls round the stalks, with intervals between each whorl; they are of the lip kind; the two lips are each cut into three segments, the middle being larger than the two side segments; they are in some plants white, and in others blue; these are generally late before they appear, so that in bad seasons they do not open fair in England, and in warm years the plants produce no seeds here. The flowers have an agreeable odour when they open fair, and make a good appearance in autumn, when the flowers of most other shrubs are gone, for in warm mild seasons I have seen these shrubs in full flower the middle of October.

The second fort grows naturally in the south of France, and in Italy; this is a lower shrub than the first; it seldom rises more than four or five feet high, coming up with several stalks from the root, which do not branch so much as the former; their bark is also whiter. The leaves are fingered, and composed of five or seven lobes which unite at the foot-stalk; these are not so disproportionate in their length, the longest being seldom more than three inches, and the shortest an inch and a half; they are near an inch broad, and are sawed on their edges, and are not so stiff as those of the former. The flowers come out in panicked spikes toward the end of the branches; the spikes are shorter, and the flowers smaller than those of the first fort, and appear sooner; they are all of them blue which I have seen.

The third fort grows naturally in both Indies; this has a shrubby stalk which rises nine or ten feet high, sending out many side branches which have a brown bark, and are garnished with leaves which have sometimes three, and at others five, oval acute-pointed lobes which are entire, and a little downy on their under side. The flowers are disposed in panicles, which arise at the division of the branches; these are small and white, but are not succeeded by any seeds in England.

The fourth fort grows naturally in the northern parts of China, where it rises with woody stalks eight or ten feet high, having a gray bark. The branches come out opposite, and are garnished with leaves placed opposite upon long foot-stalks; these are composed of three or five spear-shaped lobes which are deeply sawed on their edges, and end in very acute points; the largest of these lobes are three inches and a half long, and an inch and a quarter broad, of a dark green on their upper side, but gray on their under. The flowers are disposed in whorled spikes, which come out opposite from the wings of the stalk, and the branches are terminated by branching spikes of flowers; these are blue, and about the size of those of the first. This flowers in July and August, but does not produce seeds in England.

The fifth fort is a native in China; this is a lower shrub than either of the former. The stalk seldom rises more than three feet high, sending out spreading branches on every side, which are slender and angular; these are garnished with leaves placed opposite, which stand upon pretty long foot-stalks; they are some of them composed of three, and others of

five lobes, which are deeply and regularly cut on their sides in form of winged leaves, and end in acute points. The largest of these lobes is about an inch and a half long, and three quarters of an inch broad in the middle; they are of a dull green colour on their upper side, and gray on their under. The branches are terminated by spikes of flowers about three or four inches long, which are disposed in whorls round the stalks; these are in some plants white, in others blue, and some have bright red flowers; they are in beauty from the middle of July to the beginning of September, but the plants do not produce seeds in Europe.

The first fort is pretty common in many English gardens, where it has been long an inhabitant, but was not much propagated till of late years. The second fort is less common, and only in some curious gardens at present. These plants are very hardy, and may be propagated by planting their cuttings early in the spring, before they shoot; they require a fresh light soil, and must be frequently refreshed with water until they have taken root; after which they must be carefully cleared from weeds during the summer season, and if the following winter prove severe, you must lay a little mulch upon the surface of the ground between the plants, to prevent the frost from penetrating to their roots, which would injure them while they are young; and as these cuttings are apt to shoot late in the year, their tops will be very tender, and the early frosts in autumn often kill them down a considerable length, if they are not protected, therefore they should then be covered with mats, which will be of great service to them. Toward the middle of March, if the season is favourable, you should transplant them either into the places where they are designed to remain, or into a nursery to grow two or three years to get strength, where they must be pruned up, in order to form them into regular stalks, otherwise they are very subject to shoot out their branches in a straggling manner.

They may also be propagated by laying down their branches in the spring of the year, in doing of which you must be very careful not to break them, for their shoots are apt to split if they are violently forced; these will take root in one year, provided they are watered in very dry weather, and may then be transplanted out, and managed as was directed for those plants raised from cuttings.

The third fort is too tender to live in the open air in England, so must be planted in pots, and constantly kept in the stove; it is propagated both by cuttings and layers, but the cuttings of this must be planted in pots, and plunged into a moderate hot-bed, covering them close with a bell or hand-glass to exclude the air; they should be refreshed with water now and then, but it must not be given them too freely. The best time to plant the cuttings is about the middle or latter end of April, for if they succeed, they will put out roots in six or seven weeks, and will then begin to shoot, so they should have the free air gradually admitted to them to prevent their shooting weak; then they may be carefully taken up, and each planted into a separate small pot filled with light earth, and plunged into the hot-bed again, shading them from the sun till they have taken new root; after which they should have plenty of free air at all times when the weather is good, treating them in the same manner as other tender plants. In winter they must be kept in a moderate temperature of heat, but in the summer they should have the free air in mild weather, but not removed into the open air.

As this plant retains its leaves all the year, it makes a variety in the stove, but the flowers have no great beauty.

The fourth fort is, I believe, lost in the English gardens, for it had lived in the open air some years, which had encouraged people to plant them in the full ground, where they were all destroyed by the severe frost in 1740, since when I have not seen one of the growing plants.

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This sort casts its leaves in autumn like the two first, and it is late in the spring before the new leaves come out; it was propagated by cuttings planted in the spring, a little before the buds opened; these were placed on a moderate hot-bed, and covered down with glasses, with which management they put out roots freely, and afterward they were gradually hardened to live in the open air.

The fifth sort has been lately introduced into the English gardens from Paris, where the plants were raised from seeds, which were sent from China by the missionaries. I was favoured with some young plants by Monsieur Richard, gardener to the King at Versailles. The two sorts with white and blue flowers have succeeded in the Chelsea Garden, but that with red flowers was injured in the way and miscarried.

This is propagated by cuttings, which must be planted in the spring in pots, plunging them into a moderate hot-bed, and treating them in the same way as the fourth sort. When the cuttings are well rooted, they should be carefully taken up, and each planted in a separate small pot filled with light earth, and placed in the shade until they have taken new root; then they may be removed to a sheltered situation, placing them with other green-house plants, where they may remain all the summer; but in autumn they must be put into shelter, for they will not live in the open air in this country; but as they cast their leaves early in autumn, so they must not have much wet in winter. The plants are late in putting out new leaves in the spring, and before these appear they have so much the appearance of dead plants, that they have been turned out of the pots by some, supposing they were so.

VITIS. Tourn. Inst. R. H. 613. tab. 384. Lin. Gen. Plant. 250. [So called from *vicio*, *Lat.* to bend or bind, because its clasps take hold of the neighbouring plants.] The Vine.

The CHARACTERS are,

The flower has a small empalement indented in five parts; it has five small petals which drop off, and five awl-shaped stamina which spread and fall away, terminated by single summits, with an oval germen having no style, crowned by a beaded obtuse stigma. The germen afterward turn to an oval or roundish berry with one cell, including five hard seeds or stones.

This genus of plants is ranged in the first section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and one stigma.

I shall not trouble the reader with an enumeration of all the sorts of Grapes which are at present known in England, which would swell this work much beyond its intended bulk, and be of little use, since many of them are not worth the trouble of cultivating; so I shall only select those which ripen pretty well in this country, or that merit a little assistance to bring them to perfection by artificial heat.

The July Grape is called by the French, *Morillon noir* *hatif*. This is a small, round, black berry, growing loose on the bunches. The juice is sugary, but has little flavour, and has no merit but that of ripening early. It ripens the beginning of August.

The Black Sweet Water, is a small roundish berry, growing close in the bunches, which are short. The skin is thin, the juice very sweet, and the birds and flies are very apt to devour them if they are not guarded. It ripens soon after the other.

The White sweet Water is a large round berry when in perfection, but these are very different in size on the same bunch; some of them will be of a large size, and others extremely small, for which reason it is not much esteemed. The juice is sugary, but not vinous. This ripens about the same time with the former.

The Chasselas Blanc, or Royal Muscadine, as it is called by some, is an excellent Grape; the bunches are generally large, and at the upper part divide with two smaller side bunches or shoulders. The berries are round, and when perfectly ripe, turn to an amber colour. The juice is rich and vinous; it ripens in

September, but if carefully preserved they will hang very late and become excellent.

The Chasselas Musque, or Le Cour Grape, as it is here called, but by some called the Frankindal, is an excellent Grape, and generally ripens well in England if it has a good aspect wall. The berries are very like those of the former in shape, size, and colour, but are fleshy and have a little musky flavour. It ripens at the same time with the former.

The Black Cluster, or Munier Grape, as it is called by the French, from the hoary down of the leaves in summer; it is a good fruit, and ripens well here. The bunches are short, the berries are oval, and are very close to each other, so that many of those which grow on the inside continue green, when the outer are perfectly ripe. It ripens in September, and is by some called the Burgundy Grape.

The Auverna, or true Burgundy Grape, sometimes called Black Morillon, is an indifferent fruit for the table, but is esteemed one of the best sorts for making wine. The berries of this are oval, and hang looser on the bunches than those of the Cluster Grape, so ripen equally, which gives it the preference.

The Corinth, or as it is vulgarly called the Currant Grape, is a small roundish berry generally without stone, of a deep black colour, and much clustered on the bunches, which are short; it has a sugary juice, and ripens in September, but will not last long.

The Red Chasselas is very like the White in size and shape, but is of a dark red colour; it is a very good Grape, but ripens later than the White, and is pretty rare in England.

The White Muscadine is somewhat like the Chasselas, but the berries are smaller, and hang looser on the bunches, which are longer, but not so thick as those of the Chasselas. The juice is sweet, but not so rich as the Chasselas.

The Black Frontinac, or Muscat noir, is a round berry of good size; they grow loose on the bunches, yet do not ripen equally. The bunches are short, the berries when fully ripe are very black, and are covered with a meal or flue like the black Plum. The juice of this is very rich and vinous. It ripens the end of September, or the beginning of October.

The Red Frontinac, or Muscat rouge, is an excellent Grape when fully ripe, but unless the season proves very warm, they rarely ripen without artificial heat in England. The bunches of this sort are longer than those of the former; the berries are large and round; when they are fully ripe, they are of a brick colour, but before they are gray with a few dark stripes, and this is frequently taken for a different kind, and is commonly called Grisley Frontinac, but I am convinced it is the same Grape. The juice of this has the most vinous flavour of all the sorts, and is greatly esteemed in France.

The White Frontinac has larger bunches than either of the former; the berries are round, and are so closely clustered on the bunches, as that unless they are carefully thinned early in the season, when the berries are very small, the sun and air will be excluded from many of the berries, so that they will not ripen; and the moisture will be detained in the autumn, which will cause them to rot. The juice of this is excellent, and if the fruit is perfectly ripe, is inferior to none. This the French call Muscat blanc.

The Alexandrian Frontinac, or Muscat d'Alexandrie, is by some called Muscat of Jerusalem. The berries of this are oval, and hang loose on the bunches; these are long and are not shouldered. There are two sorts, one with white, and the other has red berries; their juice is very rich and vinous, but they seldom ripen in England without artificial heat.

The red and black Hamburgh, by some called the Warner Grape, from the person who brought them to England. These have middle-sized berries inclining to an oval shape. The bunches are large, and their juice when ripe is sugary, with a vinous flavour. This ripens in October.

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The St. Peter's Grape has a large oval berry, of a deep black colour when ripe. The bunches are very large, and make a fine appearance at the table, but the juice is not rich, and it ripens late in the year. The leaves of this sort are much more divided than those of the other sorts, approaching to those of the Parsley-leaved Grape, so it may be distinguished before the fruit is ripe.

The Claret Grape, Bourdelais, or Verjuice Grape, the Raisin Grape, the striped Grape, and many other sorts which never come to perfection here, are not worthy of any place in gardens, unless for the sake of variety; for when they have the assistance of heat to bring them to maturity, their juice is harsh, and without flavour, so they should not occupy the room of better fruit.

All the sorts of Grapes are propagated either from layers or cuttings, the former of which is greatly practised in England, but the latter is what I would recommend, as being much preferable to the other; for the roots of Vines do not grow strong and woody, as in most sorts of trees, but are long, slender, and pliable; therefore when they are taken out of the ground, they seldom strike out any fibres from their weak roots, which generally shrivel and dry; so that they rather retard than help the plants in their growth, by preventing the new fibres from pushing out; for which reason I had rather plant a good cutting than a rooted plant, provided it be well chosen, and there is little danger of its not growing.

But as there are few persons who make choice of proper cuttings, or at least that form their cuttings rightly in England, so it will be proper to give directions for this in the first place, before I proceed. You should always make choice of such shoots as are strong, and well ripened of the last year's growth: these should be cut from the old Vine, just below the place where they were produced, taking a knot, or piece of the two years wood to each, which should be pruned smooth; then you should cut off the upper part of the shoots, so as to leave the cutting about sixteen inches long. When the piece or knot of old wood is cut at both ends near the young shoot, the cutting will resemble a little mallet, from whence Columella gives the title of Malleolus to the Vine cuttings. In making the cuttings after this manner, there can be but one taken from each shoot; whereas most persons cut them into lengths of about a foot, and plant them all, which is very wrong; for the upper part of the shoots are never so well ripened as the lower, which was produced early in the spring, and has had the whole summer to harden, so that if they take root, they never make so good plants; for the wood of those cuttings being spongy and soft, admits the moisture too freely, whereby the plants will be luxuriant in growth, but never so fruitful as such whose wood is closer and more compact.

When the cuttings are thus prepared, if they are not then planted they should be placed with their lower part in the ground in a dry soil, laying some litter upon their upper parts to prevent them from drying: in this situation they may remain till the beginning of April (which is the best time for planting them) when you should take them out, and wash them from the filth they have contracted; and if you find them very dry, you should let them stand with their lower parts in water six or eight hours, which will distend their vessels, and dispose them for taking root. Then the ground being before prepared where the plants are designed to remain (whether against walls, or for standards, for they should not be removed again,) the cuttings should be planted; but in preparing the ground, you should consider the nature of the soil, which, if strong, and inclinable to wet, is by no means proper for Grapes; therefore where it so happens, you should open a trench where the cuttings are to be planted, which should be filled with lime rubbish, the better to drain off the moisture; then raise the border with fresh light earth about two feet thick, so that it may be at least a foot above the le-

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vel of the ground; then you should open the holes at about six feet distance from each other, putting one good strong cutting into each hole, which should be laid a little sloping, that their tops may incline to the wall, but it must be put in so deep, as that the uppermost eye may be level with the surface of the ground; for when any part of the cutting is left above ground, as is the common method used by the English gardeners, most of the buds attempt to shoot; so that the strength of the cuttings are divided to nourish so many shoots, which must consequently be weaker than if only one of them grew; whereas on the contrary, by burying the whole cutting in the ground, the sap is all employed on one single shoot, which consequently will be much stronger; besides, the sun and air are apt to dry that part of the cutting which remains above ground, and so often prevents their buds from shooting.

Then having placed the cutting into the ground, you should fill up the hole gently, pressing down the earth with your foot close about it, and raise a little hill just upon the top of the cutting, to cover the upper eye quite over, which will prevent it from drying; this being done, there is nothing more necessary, but to keep the ground clear from weeds until the cuttings begin to shoot; at which time you should look over them carefully to rub off any small shoots, if such are produced, fastening only the first main shoot to the wall, which should be constantly trained up, as it is extended in length, to prevent its breaking or hanging down; you must continue to look over these once in about three weeks during the summer season, constantly rubbing off all lateral shoots which are produced, leaving only the first main shoot; and be sure to keep the ground constantly clear from weeds, which, if suffered to grow, will exhaust the goodness of the soil, and starve the cuttings.

The Michaelmas following, if your cuttings have produced strong shoots, you should prune them down to two eyes, which, though by some people may be thought too short, yet I am satisfied, from several experiments, to be the best method. The reason for advising the pruning Vines at this season, rather than deferring it till spring is, because the tender parts of those young shoots, if left on, are subject to decay in winter, for they are apt to grow late in the year, so the tops of their shoots are tender, and the early frosts will pinch them, and then they frequently are killed down a considerable length, which weakens their roots; but if they are cut off early in autumn, the wounds will heal over before the bad weather, and thereby the roots will be greatly strengthened.

In the spring, after the cold weather is past, you must gently dig up the borders to loosen the earth; but you must be very careful in doing this, not to injure the roots of your Vines; you should also raise the earth up to the stems of the plants, so as to cover the old wood, but not so deep as to cover either of the eyes of the last year's wood. After this they will require no farther care until they begin to shoot, when you should look over them carefully, to rub off all weak dangling shoots, leaving no more than one or two shoots, which are produced from the eyes of the last year's wood, which should be fastened to the wall; and so from this, until the Vines have done shooting, you should look them over once in three weeks or a month, to rub off all lateral shoots as they are produced, and to fasten the main shoots to the wall as they are extended in length, which must not be shortened before the middle or latter end of July, when it will be proper to nip off their tops, which will strengthen the lower eyes; and during the summer season, you must constantly keep the ground clear from weeds; nor should you permit any sort of plants to grow near the Vines, which would not only rob them of nourishment, but shade the lower part of the shoots, and thereby prevent their ripening, which will not only cause their wood to be spongy and luxuriant, but render it less fruitful.

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As soon as the leaves begin to drop in autumn, you should prune these young Vines again, leaving three buds to each of the shoots, provided they are strong, otherwise it is better to shorten them down to two eyes if they are good; for it is a very wrong practice to leave much wood upon young Vines, or to leave their shoots too long, which greatly weakens the roots; then you should fasten them to the wall, spreading them out horizontally each way, that there may be room to train the new shoots the following summer, and in the spring dig the borders as before.

The third season you must go over the Vines again as soon as they begin to shoot, to rub off all dangles as before, and train the strong shoots in their proper places, which this year may be supposed to be two from each shoot of the last year's wood; but if they attempt to produce two shoots from one eye, the weakest of them must be rubbed off, for there should never be more than one allowed to come out of each eye. If any of them produce fruit, as many times they will the third year, you should not stop them so soon as is generally practised upon the bearing shoots of old Vines, but permit them to shoot forward till a month after Midsummer, at which time you may pinch off the tops of the shoots; for if this were done too soon, it would spoil the buds for the next year's wood, which in young Vines must be more carefully preserved than on older plants, because there are no other shoots to be laid in for a supply of wood, as is commonly practised on old Vines.

During the summer you must constantly go over your Vines, and displace all weak lateral shoots as they are produced, and carefully keep the ground clear from weeds, as was before directed, that the shoots may ripen well; which is a material thing to be observed in most sorts of fruit-trees, but especially in Vines, which seldom produce any fruit from immature branches. These things being duly observed, are all that is necessary in the management of young Vines; I shall therefore proceed to lay down rules for the government of grown Vines, which I shall do as briefly as possible. And,

First, Vines rarely produce any bearing shoots from wood that is more than one year old, therefore great care should be taken to have such wood in every part of the trees; for the fruit are always produced upon the shoots of the same year, which come out from buds of the last year's wood. The method commonly practised by the gardeners in England is, to shorten the branches of the former year's growth, down to three or four eyes, at the time of pruning; though there are some persons who leave these shoots much longer, and affirm that by this practice they obtain a greater quantity of fruit; but however this may be, it is a very wrong practice, since it is impossible, that one shoot can nourish forty or fifty bunches of Grapes, so well as it can ten or twelve; so that what is gotten in number, is lost in their magnitude; besides, the greater quantity of fruit there is left on Vines, the later they are ripened, and their juice is not so rich; and this is well known in the wine countries, where there are laws enacted to direct the number and length of shoots that are to be left upon each Vine, lest by overbearing them, they not only exhaust and weaken the roots, but thereby render the juice weak, and so destroy the reputation of their wine.

Wherefore the best method is, to shorten the bearing shoots to about four eyes in length, because the lowermost seldom is good, and three buds are sufficient, for each of these will produce a shoot, which generally has two or three bunches of Grapes; so that from each of those shoots there may be expected six or eight bunches, which is a sufficient quantity. These shoots must be laid about eighteen inches asunder, for if they are closer, when the side shoots are produced, there will not be room enough to train them against the wall, which should always be provided for; and as their leaves are very large, the branches should be left at a proportionable distance

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from each other, that they may not crowd or shade the fruit.

At the winter pruning of your Vines you should always observe to make the cut just above the eye, sloping it backward from it, that if it should bleed, the sap might not flow upon the bud; and where there is an opportunity of cutting down some young shoots to two eyes, in order to produce vigorous shoots for the next year's bearing, it should always be done, because in stopping of those shoots which have fruit upon them as soon as the Grapes are formed, which is frequently practised, it often spoils the eyes for producing bearing branches the following year, and this reserving of new wood is what the vignerons abroad always practise in their vineyards. The best season for pruning of Vines is the end of October, for the reasons before laid down.

The latter end of April, or the beginning of May, when the Vines begin to shoot, you must carefully look them over, rubbing off all small buds which may come from the old wood, which only produce weak dangling branches; as also when two shoots are produced from the same bud, the weakest of them should be displaced, which will cause the others to be stronger; and the sooner this is done, the better it is for the Vines.

In the middle of May you must go over them again, rubbing off all the dangling shoots as before, and at the same time you must fasten up all the strong branches, so that they may not hang from the wall; for if their shoots hang down, their leaves will be turned with their upper surfaces the wrong way, and when the shoots are afterwards trained upright, they will have their under surface upward; and until the leaves are turned again, and have taken their right position, the fruit will not thrive; so that the not observing this management, will cause the Grapes to be a fortnight or three weeks later before they ripen; besides, by suffering the fruit to hang from the wall, and be shaded with the closeness of the branches, it is greatly retarded in its growth; therefore, during the growing season, you should constantly look over the Vines, displacing all dangling branches and wild wood, and fasten up the other shoots regularly to the wall, as they are extended in length; and towards the middle of June you should stop the bearing branches, which will strengthen the fruit, provided you always leave three eyes above the bunches; for if you stop them too soon, it will injure the fruit, by taking away that part of the branch which is necessary to attract the nourishment to the fruit, as also to perspire off the crudities of the sap, which is not proper for the fruit to receive.

But although I recommend the stopping those shoots which have fruit at this season, yet this is not to be practised upon those which are intended for bearing the next year, for these must not be stopped before the middle of July, lest, by stopping them too soon, you cause the eyes to shoot out strong lateral branches, whereby they will be greatly injured.

During the summer season you should be very careful to rub off all dangling branches, and train up the shoots regularly to the wall as before, which will greatly accelerate the growth of the fruit, and also admit the sun and air to them, which is absolutely necessary to ripen and give the fruit a rich flavour; but you must never divest the branches of their leaves, as is the practice of some persons; for although the admitting of the sun must be necessary to ripen them, yet if they are too much exposed thereto, their skins will be tough, and it will retard their ripening; besides, the leaves being absolutely necessary to nourish the fruit, by taking them off, the fruit is starved, and seldom comes to any size, as I have several times observed; therefore a great regard should be had to the summer management of the Vines, where persons are desirous to have their fruit excellent, and duly ripened.

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When the fruit are all gathered, you should prune the Vines, whereby the litter of their leaves will be entirely removed at once, and their fruit will be the forwarder the succeeding year, as has been before observed.

As many of the richest and best sorts of Grapes will not ripen in England, unless the season proves very warm, or the soil and situation are very favourable, there have been many hot walls built to accelerate the ripening of this fruit, and bring it to full perfection by artificial heat; and as these succeed very well when they are properly contrived, and the Vines rightly managed, I shall here give proper directions, which, if duly attended to, will be sufficient to instruct persons in both.

The method of building hot walls will be treated under the article WALL, so I shall pass it over in this place, and proceed to the preparing of the ground for planting. The borders against these hot walls should have the earth taken out two feet deep (provided the ground is dry,) otherwise one foot will be sufficient, because in wet land the borders should be raised at least two feet above the level of the ground, that the roots of the Vines may not be injured by the wet. When the earth is taken out, the bottom of the trench should be filled with stones, lime rubbish, &c. a foot and a half, or two feet thick, which should be levelled and beaten down pretty hard to prevent the roots of the Vines from running downward. The trenches should be made five feet wide at least, otherwise the roots of the Vines will in a few years extend themselves beyond the rubbish, and finding an easy passage downwards, will run into the moist ground, and thereby imbibe so much wet, as to lessen the vinous flavour of the Grapes; but before the rubbish is filled into the trench, it is a better method to raise a nine inch wall, at five feet distance from the hot wall, which will keep the rubbish from intermixing with the neighbouring earth, and also confine the roots of the Vines to the border in which they are planted, so that they cannot reach to the moisture of the ground about them. This nine inch wall should be raised to the height of the intended border, so will be of great use to lay the plate of timber of the frames upon, which will be necessary to cover the Vines when they are forced, whereby the timbers will be better preserved from rotting; and where the borders are raised to any considerable height above the level of the ground, these walls will preserve the earth of the borders from falling down into the walks; but in carrying up these walls, it will be proper to leave little openings about eight or ten feet distance, to let the water pass off, because when the rubbish at the bottom of the trench unites and binds very hard, the water cannot easily find a passage through it; therefore it will be the better method to leave these small passages in the front wall, lest the moisture being confined at bottom, should be pent up as in a ditch, which will be of ill consequence to the Vines, but these openings should be two feet below the surface.

When the walls are finished and thoroughly dry, the rubbish should be filled in, as before directed; then there should be fresh light earth laid upon it two feet thick, which will be a sufficient depth of soil for the Vines to root in. These borders should be thus prepared at least a month or six weeks before the Vines are planted, that they may have time to settle. The best time to plant them is about the end of March, or the beginning of April, according as the season proves early or late. These I would also advise to be planted with cuttings, rather than rooted plants, for the reasons before assigned, but there should be two cuttings put into each hole, or placed at a nearer distance, lest any of them should fail; for if all should succeed, the weakest of them may be easily drawn out the following spring. These cuttings should be well chosen from good bearing Vines, and the shoots should be well ripened, otherwise they will never make good plants. The distance these Vines should

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be allowed to remain is the same as for common walls, i. e. about six feet. In planting them there should be holes opened with a spade, about fourteen or fifteen inches deep, for if there be but three or four inches of good earth under the foot of the cuttings it will be sufficient; then the cuttings should be laid in the holes a little sloping, afterward the earth should be filled into the holes, and gently pressed with the foot to the cuttings, and raised in a heap over them, so as just to cover the uppermost eyes of the cuttings; afterward lay a little mulch on the surface of the ground about the cuttings, to prevent the sun and air from drying the earth, and if the spring should prove very dry, they should have some water once a week, which will be as often as the cuttings require it, for nothing will destroy them sooner than too much water, which rots their bark, and destroys them. If these cuttings are well chosen, and the instructions here laid down duly observed, they will make strong shoots the first summer, for I have frequently planted cuttings which have shot five feet in one year, but then I carefully rubbed off all the side dangling shoots as they were produced, and never permitted more than one shoot to remain on each cutting, which is what should always be observed by those who have the care of Vines. With this management there will be little hazard of the cuttings taking root, for in upwards of five hundred cuttings which I received from Italy, and which had been cut off from the Vines in the beginning of November, wrapped up in Moss, and put on board the ship, (which did not arrive at the port of London until March, so that they were full four months cut off before they were planted,) there were not twenty of the number which failed, and many of them shot about six feet the first season.

As I have directed the pruning of Vines to be performed in autumn (which is without dispute the best season for this work,) so in preserving of the cuttings till the planting season, I have advised them to be cut to their lengths, and their ends laid into the ground, and then covered with litter or Moss to keep the air from them; but since I have found it a much better method not to shorten the shoots, from which the cuttings are to be made; but to lay their ends just into the ground, about two inches deep, and so leave them at full length, only observing to cover them with dry litter or Peas haulm in frosty dry weather, tho' in moist weather the covering should not remain on, because it would make the cuttings grow mouldy, which would greatly injure them. Then in the spring, when they are to be planted, they should be taken out of the ground, and their upper part cut off; so as to reduce them to about fourteen inches in length, according to the distance of the buds or eyes; for those cuttings whose buds grow pretty close together, need not be left more than one foot long; but in others fourteen or sixteen inches will be full short. The leaving the upper part of the shoots on all the winter is of great service to the cuttings, because when they are cut off in autumn, the air penetrates the wounded part, and greatly injures the other eyes.

The management of these Vines, for the three first years after planting, being the same as is practised for those against common walls, I shall not repeat it in this place, having fully treated of that already; only will observe, that during these three years, the Vines should be encouraged as much as possible, and the shoots not left too long, nor too many in number on each root, that they may be duly ripened and prepared for bearing the fourth year, which is the soonest they should be forced; for when any sorts of fruit-trees are forced by fire too young, they seldom continue long in health, so that what fruit they produce is small, and not well-flavoured; therefore, in being over hasty to save a year or two, very often the whole design miscarries; for unless the trees are in a proper condition to bear much fruit, it is not worth while to make fires for a small quantity of starved ill-tasted

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fruit, the expence and trouble being the same for ten or twelve bunches of Grapes, as it will be for a hundred or more.

These Vines should not be forced every year, but with good management they may be forced every other year, though it would be better if it were done only every third year; therefore, in order to have a supply of fruit annually, there should be a sufficient quantity of walling built to contain as many Vines as will be necessary for two or three years, and by making the frames in front moveable, they may be shifted from one part of the wall to another, as the Vines are alternately forced; therefore I would advise about forty feet length of walling to be each year forced, which is as much as one fire will heat; and when the Vines are in full bearing, will supply a reasonable quantity of Grapes for a middling family; but for great families, twice this length will not be too much.

In most places where these hot walls have been built, they are commonly planted with early kinds of Grapes, in order to have them early in the season; but this I think is hardly worth the trouble, for it is but of little consequence to have a few Grapes earlier by a month or six weeks, than those against common walls, therefore I should advise, whenever a person is willing to be at the expence of these walls, that they may be planted with some of the best kinds of Grapes, which rarely come to any perfection in this country without the assistance of some artificial heat, of which the following sorts are the most valuable.

The Red Muscat of Alexandria.

The White Muscat of Alexandria.

The Red Frontinac.

The White Frontinac.

The Black Frontinac.

When the Vines which are planted against the hot walls are grown to full bearing, they must be pruned and managed after the same manner as hath been directed for those against common walls, with this difference only, viz. that those seasons when they are not forced, the Vines should be carefully managed in the summer for a supply of good wood, against the time of their being forced, so that it will be the better method to divest the Vines of their fruit, in order to encourage the wood; for as few of the sorts will ripen without heat, it is not worth while to leave them on the Vines during the season of resting, except it be the common Frontinacs, which in a good season will ripen without artificial heat, but even these, I would not advise many Grapes to be left on them during the years of their resting; because as the design of this is to encourage and strengthen them, therefore all possible care should be had that the young wood is not robbed by overbearing; for those years when the Vines are forced, the joints of the young wood are generally drawn farther asunder, than they ordinarily grow in the open air; so that when they are forced two or three years successively, the Vines are so much exhausted, as not to be recovered into a good bearing state for some years, especially if they are forced early in the season; or where great care is not taken in the summer to let them have a proper share of free air, to prevent their being drawn too much, and also to ripen their shoots. Those years when the Vines are forced, the only care should be to encourage the fruit, without having much regard to the wood, so that every shoot should be pruned for fruit, and none of them shortened for a supply of young wood, because they may be so managed by pruning in the years of their resting, as to replenish the Vines with new wood. Those Vines which are designed for forcing in the spring, should be pruned early the autumn before, that the buds which are left on the shoots, may receive all possible nourishment from the root, and at the same time the shoots should be fastened to the trellis in the order they are to lie; but the glasses should not be placed before the Vines till about the middle or end of January, at which time also the fires must be lighted, for if they are forced too early

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in the year, they will begin to shoot before the weather will be warm enough to admit air to the Vines, which will cause the young shoots to draw out weak, and thereby their joints will be too far asunder, so consequently there will be fewer Grapes on them, and those bunches which are produced will be smaller than when they have a sufficient quantity of air admitted to them every day.

If the fires are made at the time before directed, the Vines will begin to shoot the middle or latter end of February, which will be six weeks earlier than they usually come out against the common walls, so that by the time that other Vines are shooting, these will be in flower, which will be early enough to ripen any of these sorts of Grapes perfectly well. The fires should not be made very strong in these walls, for if the air is heated to about ten degrees above the temperate point on the botanical thermometers, it will be sufficiently warm to force out the shoots leisurely, which is much better than to force them violently. These fires should not be continued all the day time, unless the weather should prove very cold, and the sun does not shine to warm the air, at which times it will be proper to have small fires continued all the day; for where the walls are rightly contrived, a moderate fire made every evening, and continued till ten or eleven of the clock at night, will heat the wall, and warm the inclosed air to a proper temperature; and as these fires need not be continued longer than about the end of April (unless the spring should prove very cold,) so the expence of fuel will not be very great, because they may be contrived to burn either coal, wood, turf, or almost any other sort of fuel; though where coal is to be had reasonable, it makes the evenest and best fires, and will not require so much attendance. When the Vines begin to shoot, they must be frequently looked over to fasten the new shoots to the trellis, and rub off all dangling shoots; in doing of which great care must be taken, for the shoots of these forced Vines are very tender, and very subject to break when any violence is offered. The shoots should also be trained very regular, so as to lie as near as possible to the espalier, and at equal distances, that they may equally enjoy the benefit of the air and sun, which is absolutely necessary for the improvement of the fruit. When the Grapes are formed, the shoots should be stopped at the second joint beyond the fruit, that the nourishment may not be drawn away from the fruit in useless shoots, which must be avoided as much as possible in these forced Vines; upon which no useless wood should be left, which will shade the fruit, and exclude the air from it by their leaves.

As the season advances and the weather becomes warm, there should be a proportionable share of free air admitted to the Vines every day, which is absolutely necessary to promote the growth of the fruit; but the glasses should be shut close every night, unless in very hot weather, otherwise the cold dews in the night will retard the growth of the fruit. The bunches of the White Frontinac should also be carefully looked over, and the small Grapes cut out with very narrow-pointed scissars, in order to thin them, for these berries grow so close together on the bunches, especially the White Frontinac, that the moisture is detained between them, which often occasions their rotting, and the air being excluded from the middle of the bunches, the Grapes never ripen equally, which by this method may be remedied, if done in time; and as these Grapes are protected by the glasses from the blights which frequently take those which are exposed, there will be no hazard in thinning these Grapes soon after they are set, at which time it will be much easier to perform this operation, than when the Grapes are grown larger, and consequently will be closer together; but in doing of this the bunches must not be roughly handled, for if the Grapes are the least bruised, or the farina, which there naturally is upon them, be rubbed off, their skins will harden, and turn of a brown colour,

so the fruit will never thrive after; therefore the scissars which are used for this purpose, should have very narrow points, that they may be more easily put between the Grapes without injuring the remaining ones. The other sorts of Grapes which I have recommended for these hot walls, do not produce their fruit so close together on the bunches, so they will not require this operation, unless by any accident they should receive a blight, which often occasions a great inequality in the size of the Grapes; which, whenever it thus happens, will require to be remedied by cutting off the small Grapes, that the bunches may ripen equally, and appear more sightly.

By the middle of June these Grapes will be almost full grown, therefore the glasses may be kept off continually in the day time, unless the season should prove very cold and wet, in which case they must be kept on, and only opened when the weather is favourable; for as the racy vinous flavour of these fruits is increased by a free air, so during the time of their ripening, they should have as large a share as the season will admit to be given them.

Before the Grapes begin to ripen, they must be carefully guarded against birds, wasps, and other insects, otherwise they will be destroyed in a short time: to prevent which, the Vines should be carefully covered with nets, so as to exclude the birds, who make great havock with the Grapes, by breaking their skins; and if there are a few twigs covered with birdlime placed here and there on the outside of the nets, it will be of service, because the birds are often so bold as to attempt to break the nets to get to the Grapes; which, if they attempt, they may be so entangled on these twigs, as not to get loose; and whenever that happens, they should not be disengaged, but suffered to remain to keep off their companions; and if they get off themselves, it will have the desired effect, for there will few other birds come to the same place that season, as I have more than once experienced.

As to the wasps, the best method is to hang up some phials about half filled with sugared water, and rub the necks of the phials with a little honey, which will draw all the wasps and flies to them, which, by attempting to get at the liquor, will fall into the phials and be drowned; these phials should be carefully looked over once in three or four days to take out the wasps and destroy them, and to replenish the phials with liquor. If this be duly observed, and the phials placed in time, before the Grapes are attacked, it will effectually prevent their being injured; but where these precautions are not taken, the Grapes will be in danger of being absolutely destroyed; for as these early Grapes will ripen long before any others against common walls, they will be in much more danger, there being no other fruit for them at that season in the neighbourhood; whereas, when Grapes in general begin to ripen, there is a quantity in almost every garden; so that if they destroy a part in each garden, yet there will be a greater chance to have some escape, than where there is only one wall for them to attack.

These sorts of Grapes being forced in the manner before directed, will begin to ripen early in August, especially the Black and Red Frontinacs, which will be fit for the table a fortnight earlier than the other sorts; but as the design of forcing them is to have them in as great perfection as possible in this climate, they should not be gathered until they are thorough ripe, for which reason some of the later sorts should be left on the Vines till September; but then the glasses should be kept over them in wet and cold weather to protect the fruit from it, but whenever the weather is fair, the glasses must be opened to let in the free air, otherwise the damps, arising from the earth at that season, will cause a mouldiness upon the Grapes, which will rot them; so that if the season should prove very cold and wet while the fruit are upon the Vines, it will be proper to make a small fire every night to dry off the damps, and prevent this injury. Most people in England gather their

Grapes too soon, never suffering them to remain on the Vines to ripen perfectly, even in the warmest seasons, when, if they are left on till after Michaelmas, they will be good.

Of late years many persons have planted Grapes against espaliers, which in some places have succeeded very well in good seasons; but if they are not planted in a good soil and to a proper aspect, and the sorts rightly chosen, they seldom produce any fruit which are fit to be eaten. The soil proper to plant Vines in espaliers, should be the same as is hereafter directed for vineyards, viz. either a chalky or gravelly bottom, with about a foot and a half or two feet of light hazel earth on the top, a little sloping to the south or south east, that the wet may easily find a passage, so as not to remain on the ground. In such a soil situated to the sun, and screened from cold winds, there are several sorts of Grapes, which in warm seasons will ripen very well in England.

But there are some curious persons who line the back side of their espaliers with low Reed hedges, and others who do it with thin slit deals; both of which are a good defence to the Vines against blights in the spring, and accelerate the ripening of the Grapes, so that in tolerable seasons they will come to good maturity. Neither of these methods are very expensive, for these close fences need not be more than four feet high, because the Vines being to be managed after the same manner as those in vineyards, the branches which carry the fruit will never rise above that height; for the bearing shoots must always be trained about two feet above the surface of the ground, so that the fruit will be always below the top of the close fences; and as for the upright shoots, which are designed for the next year's bearing, it matters not how much they rise above the fence; so these may have a loose trellis, to which they may be fastened, to prevent their overhanging the fruit.

In the making of these kinds of close espaliers for Grapes, it will be proper to lay one strong oaken plank (such as are procured in breaking up old ships or barges,) next the surface of the ground, which will last many years sound, and be very useful in supporting the fences. If these planks are fifteen inches broad, as they may always be readily procured, and the upper part of the fence be Reeds, there may be two lengths cut out of them (provided the Reeds are of a due length,) without including their tops. In the front of these hedges should be a slight trellis to fasten the Vines to, which may be made of Ash poles. The upright poles of these trellisses need not be nearer together than eighteen inches; and if there are three cross poles, at about a foot asunder, they will be sufficient to fasten the bearing shoots of the Vines at proper distances in the manner they are designed to be trained, which should be in such positions, that the fruit may not be overshadowed by the branches; and if the upright poles are cut so long, as to be a foot and a half above the Reeds, they will be tall enough to support the upright shoots for the next year's bearing, which being trained singly at proper distances, will have the advantage of the sun and air to ripen the wood, much better than where four or five shoots are fastened to the same pole.

To this trellis the Reeds may be fastened with hoops on the back side, after the manner usually practised in making common Reed fences; and if on the top of the Reeds there is fastened a thin slip of deal, to secure their tops from being broken, it will preserve them a long time. In making of these fences, the Reeds should not be laid too thick, for that will not only be more expence, but will be troublesome to fasten, and not last so long as when they are made of a moderate thickness: therefore as the Reeds will be cut into two lengths, each bundle will spread about six feet in length, observing first to spread the bottom parts of the bundles, which contain the largest ends of the Reeds the whole length; and then the upper parts of the other Reeds should be reversed, and spread in front of them, which will make the upper
part

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part of the fence almost as thick as the bottom. But neither these, nor the boarded fences, need be made till the Vines are in full bearing, which will be the fourth or fifth year after planting, according to the progress they make; during which time the shoots may be supported by any common stakes, for if the fences are made before the Vines are planted, as is frequently practised, they will be half decayed by the time the Vines are fit to bear, and before this time the fences are of no use to them.

The sorts of Grapes which are proper to plant against these fences are,

- The Miller Grape.
- The Chasselas White.
- The White Muscadine.
- The Sweet Water, and
- Le Cour Grape.

These, if well managed, will ripen very well, provided the season is tolerably good, and will come in soon after those of the walls; so that if they are taken care of, by hanging of mats before them, when the nights prove cold in autumn, and are permitted to hang till October, the fruit will prove very good. But where the Sweet Water Grape is planted against these fences, they will require to be covered in the spring, at the time when they are in flower, if there should be cold nights; otherwise the bunches will receive a blast, which will destroy the greatest part of the Grapes, so that many times there will not be more than six or eight good Grapes on each bunch; and the others will be small starved fruit, hardly so large as the smallest Peas.

In planting of these Vines, either for open espaliers, or the close fences, it should be performed in the same manner as for walls; the cuttings should be planted six feet asunder; and as these are only designed for the table, a single row of Vines of a moderate length will be sufficient to supply a family, where there are others against walls to come before them. But where a person is inclinable to have more rows than one, they should be placed at least twelve feet asunder, that they may equally enjoy the sun and air.

As to the pruning and other management of these Vines, that being the same as for those against walls, I shall not repeat it in this place, it being fully treated of before, and to which I have nothing here to add.

Having thus treated of the management of Vines against walls and espaliers, I come next to the culture of such as are planted in vineyards; but as the number of those in England is small, and the experience of them not very great, I shall first subjoin an account of their planting and managing their vineyards in Italy and France, and then shall add some observations and experiments of my own upon this subject. And first I shall insert a curious account of the method the Italians follow in planting their vineyards, and making their wine, which I received from an ingenious correspondent in that country, who has some vineyards of his own, and hath been very exact in his observations upon the different methods now practised by the Italian in their vineyards, which is as follows.

The method of managing their vineyards, and making their wines in Italy.

1. As to the soil; next to that of Chianti, which is in a manner all rocky, they prefer that of the hilly parts of this country, which has a warm stony bottom, with a loamy superficies; and next to that, such as has a lime stone, or chalky bottom, with a reasonably deep surface of any good earth; but in the plains, where the wines are nothing comparable to those on the hills and mountains, they are forced to content themselves with any tolerably good sort of ground, that is neither sandy nor light to excess; nor too clayey or binding, though a pretty stiff marl does well enough.

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2. As to its exposure, they chuse one that is due south, or that inclines to the west, rather than to the east; and in the plains, they are obliged to be contented, as will be here related, with a north one for part of their vineyards; which they fence however, if not naturally covered with some wood or adjacent hill, with either a good hedge, or a stone wall, against the northern blasts.

3. The manner of preparing the ground for planting differs according to the situation of it; being performed one way when on mountains, another when on more moderate hills, and a different in some respects, to that when on a plain or level.

In those plains which are very mountainous and rocky, as also on hills, where the bottom of stone is found near the superficies, and is hard, they with the help of proper instruments, or else with gunpowder, make a trench of four feet and a half wide, drawing it from east to west (and though it may be near, yet always somewhat under the summit or top of the mountain, to be covered from the north wind thereby;) and with part of the stones which they raise out of the foundation, they make a dry wall, i. e. without mortar, just below the trench; about twelve feet below this they make a second trench in like manner, leveling the ground between the trenches as well as they can, with mattocks, crowes of iron, &c. and so proceed till they have finished the whole ground they intend to plant.

The use of these little walls is, to keep the little earth there is from being washed away by the impetuous rains, for the carrying off of which, they make proper channels at convenient places; so that the whole plantation at some distance, resembles a regular magnificent pair of stairs. In which trenches, at about three feet distance one from the other, they plant the cuttings of Vines somewhat slanting, about the depth of two and a half, or near three feet; which being dressed as hereafter related, and when they come to their bearing, being kept of an equal height, make a most agreeable appearance.

When the ground is hilly, but not very mountainous, they dig a trench about four feet and a half deep, and three and a half wide; and then having thrown the earth to the northward, they make a second, with the earth whereof they fill the first; and so on one under and close to the other, till they have finished the ground they would plant; the last serving for a ditch to carry the water off, into which, at proper distances, they also make little ditches to convey the water; and having so done, and thrown the earth taken out of the first trench on the trenched ground, and levelled it so as to give it an even proper declivity, they plant it with cuttings of Vines in quadrangles, or other manner, at the distance of about five feet and a half or more, as they think most proper for their ground; if stony in the manner before related, as practised in the mountains; but if not, then as they do it in the plains, as will be hereafter described.

When the vineyard is to be made on a plain or an exact level, having staked the part out they design for walks, and laid out the divisions they intend for Vines, their next care is, that each of them have a proper declivity, and that there be good drains to carry water off; in order to which, they make the first trench in the middle of the division, extending from east to west, of the depth of four feet and a half, and near four feet in breadth, throwing the earth taken out of it northward; then laying at the bottom stones, brushwood, bones, or almost any sort of rubbish, to raise and drain it, they proceed to the second trench, with the earth of which they fill the first, and so on, till they have finished as far as the second division extends southward, laying at the bottom of every trench such rubbish as they can get; and then removing the earth taken out of the first trench over to the south side already trenched, they proceed in the same manner on the north side, as far as the division extends; when in the last trench there will naturally remain a ditch (the

side

side of which some very curious people wall with a dry wall) to carry off the water, whence they take care to make proper drains to carry it away.

This being done, they proceed to level this piece of ground, giving each side thereof its proper declivity; so that it somewhat resembles a roof that is not steep, or as they here term it, a mule's back, bearing the following figure; and this they do to preserve the



Vines they plant the longer, and to make them render better wines, whilst those that are planted on the flat, and on the borders of ditches, where they are supported by a sort of Poplar-trees, and serve for the division of the Corn fields; though the Vines grow to a great thickness, and produce much fruit, yet they render a wine that is good for little, and the Vines will not last above thirty-five or forty years; whereas what is so planted, being tolerably well looked after, hold good for one hundred and forty, or one hundred and fifty, and in Chianti they will last above three hundred years, they there accounting those of one hundred years old as young Vines.

N. B. To defray in good part the charge of this expensive culture, those in the plains, the very first year, sow a hole of Melons between Vine and Vine, which they make about ten inches diameter, and a foot deep, filling about three fourths of it with good macerated dung, and the rest with fine good earth (of which that left by land floods is esteemed the best,) in which they put about fifteen or twenty seeds; which being come up, before they put out the domestic leaf, they nip the tops of all but two, or at most three, of the strongest plants, which they leave to bear fruit, and order accordingly. After which they plant Cauliflowers, or Broccoli of Cauliflowers; and this they also do in the hills so trenched; but in the mountains Melons do not well in the trenches; but Beet-root is often produced, and Cauliflowers.

4. The ground being so ordered, where the vineyard is a plain, or on the hills, they proceed to mark it out with lines according to the distances they would plant at, endeavouring to do it in rows about three feet Vine from Vine, and about four or four and a half, from row to row; but for the most part in a quadrangular manner, at the distance of about four feet one from the other, drawing lines lengthways and athwart; in the cross they plant the cut of a Vine in the following manner:

Having an iron crow of an inch or more diameter a little pointed at the end, they therewith make a hole directly down about three feet and a half deep; then being provided with an instrument they call a cruccio, having a handle of wood like that of a large augur, and the body of iron four feet long, and more than half an inch in diameter, at the end of which there is a nich something like a half moon, making this figure,



they, after twisting the end of the cutting, put it therein, and force it down to the bottom of the hole, where they then leave it, and afterwards fill up the vacancy with fine sifted earth or sand, observing to tread the earth close to the plants, which otherwise (unless it be stiff land) is often inclinable to be loose and dry, especially if rain does not soon follow their planting; and it is incredible how many Vines three persons can in this manner plant in one day, viz. upwards of two thousand.

As the cuttings are of a good length, there generally remain about two feet or more of them above the ground when planted, and sometimes more. When,

as it frequently happens, they find the earth shallow, so that in the trenching they arrive at prime rock, or a cold bleaky clay, at the depth of about three feet, and therefore they trench not lower, they plant the depth of two feet and a quarter, or two and a half, shallower than which they never plant, and even then, if the bottom be clay, they will do but little; and if rocky, are apt to suffer in the summer by dry hot weather, (though if once they strike their roots in the rock, they do well enough,) and yield the best wine that is made in the plains; which however, though planted with the same sort of Vines as those of the mountains, and even of cuttings brought from thence, never produce near so good wines as those that grow there, notwithstanding the Grapes ripen three weeks, if not a month sooner.

N. B. This tillage and plantation is performed at any time between November and March, in dry, but not frosty weather; since then the frozen earth in working, being naturally thrown into the bottom of the trench, where the Vines are to make their principal roots, it retains such a frigidity, that they will thrive but badly in it; which will be the case also, if the ground be laboured too wet; wherefore this trenching, or thorough tillage, is generally performed in February, after the severity of the frosts is over, and may be planted at any time between that and April; whilst, as for the cuttings, they are observed to do best when planted as soon as cut off in the dressing; but if that conveniency is not to be had, they may be brought from any reasonable distance, their cut ends only being tied up, and covered from the air with Moss, straw, or the like; or if from a greater, with some earth about them, and may be kept, burying their cut ends in the ground, till such time as they can be used; but just before this is done, it is proper to put them in water for twelve hours or more, since that will influence them to strike root the better.

It is not of much importance that the cuttings be from the best sort of Grapes; tho' that is best, if easily to be had, but may be from any Vines in the neighbourhood that thrive well; for afterwards, when they come to their bearing, you may with little trouble, ingraft them with cuttings from Vines of the sorts you desire, and these will bear some fruit the very year they are ingrafted, and most abundantly the next; besides that, the foot of the Vine or stock will receive benefit by this operation.

5. The plantation having been made in the manner before related, the first culture of it is performed different ways, which may be termed the old, and the modern.

According to the old way, above a month after the planting, when they begin to shoot, they cut off the tops of the plants just above the second eye that is above the ground, and so let them remain, and shoot out at pleasure; only after the Melons, &c. (which, as is said before, are planted or raised in the vacancies) are gathered, they dig and sow, at proper distances, the ground with Beans, Kidney-Beans, Turneps, Beets, or the like; and let the Vines shoot and grow at liberty till the third year, (that is, when they have been planted three years complete;) then opening the earth about each plant in March, or towards the beginning of April, to the depth of about a foot, they, with their hand, clear away the superficial roots, and then throw in two handfuls of good half consumed sheeps dung, or else of Lupines that have been par-boiled; after which with a sharp instrument, (either a bill or a strong pruning knife) and a steady hand, they cut off the head of the plant just below the lowest shoot, which is sometimes a finger or two under ground, rubbing the part cut over with some of the contiguous earth; and then, upon its shooting, take the principal shoot (gently cleaning away the rest,) and fix it with a green Bulrush to a small stick, to keep it when tender from being broken by the winds, and so let it remain till the next dressing season; when having pruned it, leaving but one eye, they put a stick that is something more substantial, of between three or four feet long, to support it from time to time, tying the shoot to it till the month of July, before

fore the entrance of the dog days, at which time they nip off the head of it, which checks its luxuriancy, and renders the fruit, which it will then begin to have in small bunches nine or ten Grapes each, better and larger, tying the remainder of the said shoot to the stick. In the next year they order it in the same manner; and so on till the seventh year after planting, when it begins to give fruit to purpose; and then at dressing they generally leave but one head on the most vigorous plants, and only two eyes on that, and stake them with substantial stakes of more than an inch diameter, and near six feet long; one of which, or more, go into the ground (of which those made of wild Chestnut, the coppices of which they cut once in seven or eight years, for resisting both wet and dry, are accounted the best;) and when they begin to shoot, they tie them to those with the small twigs of Broom or Osiers, and so visiting them frequently in the course of the summer, to keep them tied, as also to nip off luxuriant branches, they let them remain till the dog days are over, when they clear them of some of their leaves, that the fruit may ripen the better.

N. B. *In dressing them after the sixth year, if they have made more shoots than one, as most of them will have done, they, as before, cut them all away, unless they have occasion for them to supply the places of some contiguous plants that have miscarried; and in moist warm weather they lay those shoots down more than a foot under the ground, carrying the heads of them where they design, and this they term propagation. The best of the shoots that they cut off from their Vines of seven years old or older, they either reserve for any new plantations that they are to make, or to sell, at about nine-pence sterling per hundred.*

In dressing from the seventh year forward, they reserve the lowest head they can, provided it be vigorous, and endeavour to keep their Vines as low as may be, for the fruit to enjoy the warm reflection of the earth after the sun beams are gone from it, to ripen it, and give it life and vigour; but not so as to let the ends of the bunches touch the ground, or be so near to it as that they might be dashed therewith by the rains, since that would be apt to rot the Grapes; whilst in Chianti (where the Vines, though most abundant in the product of their fruit, are not so lavish of their shoots, but are easily kept in good order, by a hand that is tolerably skilful) it is incredible how exactly even the Vines are kept, about the height of four feet from the ground, which contributes to the making the beautiful prospect before-mentioned.

The modern way is as follows:

A month or thereabouts after planting, when the young plants begin to shoot, they prune them just above the first eye that remains out of the earth, whereat, when they (as they naturally will) have made their shoots, toward the beginning of June, and so that they can discern which of the several they put out are the strongest, and appear the most thriving, they carefully and gently with the thumb, rub off all of them except one, which they judge to be the strongest, and for the most part the nearest the ground; which diligence they renew every eight or ten days, or oftener, if the weather chance to be wet, taking away all the new shoots which they will abundantly make, ever leaving only the principal shoot; which, that it may not be prejudiced by the winds, or the feet of the people (who frequently, during the progress of the Melons sown between them, must go to nip off the running branches, and cultivate them, and who, at the same time, with great convenience, do this work about the Vines,) they gently tie, as soon as it is capable of it, to a small stick; and if, as it often happens, it proves very luxuriant, they nip off its top; and this rubbing off of the young shoots they continue till the month of October, (though unless there be frequent rains, there will, about the beginning of August, be few shoots to ease them of,) whilst sometimes the principal shoots will bear fruit in small bunches of five or six Grapes each; but as they are

always late, they will not ripen; wherefore, that the strength of the plant may not be lessened or impaired thereby, they generally crop them off; after which they let the Vines remain till pretty early in the spring, when the intermediate crop of Cauliflowers, or Broccoli of Cauliflowers is taken off; then in the month of February, they open the earth about the foot of each plant, and clear it of its superficial roots, and manure it in the manner before described in the cultivation of those in the old way. The third year they dress the shoot so as to leave but one eye upon it, and afterwards digging all the ground in the intermediate spaces, to requite the expence of culture, they sow a sort of Kidney-beans, which not rising above a foot in height, or scarce so much, does not prejudice the young Vines; to which they now give somewhat more substantial sticks, whereto they continue to tie them, as also to rub off any new shoots that they make, visiting them for that end; as also to crop off all the lavish tops of the shoots, only three or four times in the summer; and the next year in dressing, they bestow substantial stakes on them, whereto they tie them with Broom twigs, or small Osiers when they begin to be in a pretty good state of bearing, producing two or three pretty large bunches of Grapes which (as those of the antecedent year) ripen well, but come not to be the full of their bearing till the fourth or fifth year; however, they anticipate those ordered the other way three or four years; and this is withal the surer way of the two, since in cutting off the heads of the others many are lost, whereas this way, few, if any fail.

N. B. *What is before said of a Vine's coming to its full bearing, is only to be understood in respect to the quantity of the fruit, a little more or less; for as to the quality, it is generally esteemed to be meliorating till the twentieth year (being duly cultivated,) and the wines coming from it richer and better; and in Chianti they mix not with their best Grapes, those of the product of Vines of a less age than fifteen or sixteen years, and pretend they are always meliorating for fifty years.*

The Vines being by one or other of those methods, brought to a full bearing state, they must be annually dressed, according to the vigour of the plant, and duly staked.

In dressing, to those of moderate strength and vigour, they leave but one eye, or at most two; and to the most strong and vigorous, but three or four at the very most; and then they tie them not as they do when they are but one or two, but fixing another less substantial stick in the ground near the main one, to the top of which, for its better support, they tie it with an Osier; they bend down, and fix the head thereto in the following form.



And sometimes, when they find one of a very extraordinary vigour, and that has two good heads, they leave them both, and disposing of one in the manner just before related, to the other, having fixed another stick on the other side of the principal stake, and tied it, they in the like manner bend down to tie thereto, when it comes to form the following figure.



This done, they continue from time to time to bind the new shoots to the stakes, and to nip off the tops of them, when too luxuriant, till towards the time of ripening. When the dog days are past, they disburden them of some of their leaves, to expose the fruit

then turning colour more to the sun, and to accelerate the ripening of it.

N. B. *What is said above in relation to the leaving more than one head, and the ordering thereof, only relates to such as are in vineyards on the plains and hills; for in the mountains, as their stakes are stronger and thicker, they affix some wood work to them; on which frame they run two and sometimes three heads, making the shape of a wheel.*

Here also it may be proper to observe, That all landlords of vineyards, at letting them, ever reserve to themselves the privilege of visiting them at their pleasure, to see if they are duly dressed, and not more eyes left to a Vine than there ought to be; for it is possible, in three years time, only by pruning, to spoil the best vineyard that is, past almost the power of art to recover it, and at the same time make it yield much wine; for it is but leaving instead of one or two eyes, five or six; and of three or four, eight or nine, and it will be reduced unto so weak and exhausted a state, and the Vines so run into wood, that it will be past recovery; and the only method is to cut the Vines down a foot of six inches under ground, and rear up a new shoot, which, besides the time that will be lost in so doing, will hardly after all, prove effectual. And this manner of pernicious pruning the Italians call a lascia podera, which in English, is quit farm, which is a proper term enough.

As for the time of dressing Vines, if it may properly be so called, there is nothing wherein those people differ more, some performing it immediately after the Grapes are gathered, as in Carignano and Val d'Arno; others do it at all times, as their conveniency permits, and if the season is mild and open (leaving their youngest Vines till the last,) from November to March; and in Chianti, as the region is colder, and their Vines late to move, they do it late in the month of March, and even to the beginning of April; others again do it at twice, in November, when they leave an eye extraordinary, and in March they cut off that extraordinary eye, which last method seems to be the best; though, to have cuttings for a new plantation, it can only properly be done in February or March.

As to sowing in their vineyards, they also differ as much. In Chianti they leave a space of about three feet from their Vines, from thence to the low wall, many sow Wheat; and though the soil seems to be little else but stones, and such as only can be worked by a mattock, yet it bears prodigious crops, thirteen or twenty for one. Others again, in that space, will only sow the low sorts of Kidney-beans, Lentils, and such low plants, and others again will not sow any, the least thing at all, as in the general they do not in the vineyards on the hills, but in the plains, after the heads of their Vines are risen so high, as to be higher than the tops of Beans, they make no difficulty between every row of Vines, to sow a row of them, as the most scrupulous do not, to sow late in April a row of low Kidney-beans; whilst some of late, laying two rows of Vines into one, whereof with strong stakes and canes they make a sort of espaliers, and in the middle, (that is between row and row,) being near four feet from each, plant a row of Artichokes, which they say, being well dug in their proper seasons, part of the nourishment going to the Vines, does them more good than harm.

As for the season of digging their vineyards, they all agree that the later it is done in the year, the better it is; wherefore, in the places where they sow nothing, they let that work alone till the latter end of April, or beginning of May; when according to the nature of the ground, they do it with a spade or mattock. And again, the more especially to kill the weeds, and forward the ripening of the plants, they stir it with a strong hoe or mattock, and when they can, with a spade in the dog days; but in so doing they take a most particular care that they touch not any of the roots of the Vines, for that, if it did not kill them, would at least make them wither, and spoil their fruit.

6. As for manuring their vineyards in all parts, when they are in a bearing condition, they practise it but once in five or six years, when they open the earth about the roots, and taking away the small ones, which they may have made towards the superficies, they throw in a handful or two of sheeps dung, or of that of goats or deer, for if any of these are not easily or in sufficient quantity to be had, then of parboiled Lupines, which, although agreeable to the Vine, yet being of little substance, must be the oftener repeated, every three years at least, when they cover it again; and this they perform in the months of October and November, that the winter rains falling thereon, may make it descend to the utmost fibres of the roots, and afford them nourishment.

7. The season for gathering the Grapes, and making the vintage, is very uncertain, depending upon the weather that has been the preceding spring and summer, which makes it sooner or later fifteen or twenty days in Chianti. When the season has been good, they begin to cut their Grapes about Michaelmas, and in the plains a week or ten days sooner. In this they every where govern themselves according to the ripeness of their Grapes, and the prospect of the weather, aiming to have a perfect dry season to do it in.

8. The Grapes being of a due ripeness, and the weather warm and dry, as soon as the sun or wind has dried up the dew that was on them, they cut them and put them into piggins, and carry them, if at a distance, on mules, or if near, between two men, to the wine vat, and then, either bruising them to mash in the said piggins with a club, throw them directly therein, or else into a thing resembling a very large hopper, with a grate lengthwise; then boards being placed over the vat, a lad with his feet treads them out, the juice, husks, stones, and stalks all passing through the grate into the vat, and so they continue to do till the vat (which usually contains from four to five tons, sometimes eight, ten, nay, as far as fifteen or twenty in some large vineyards, in which there are sometimes several of them) is full, when immediately, or sometimes in a few hours before they fill it, it will set a boiling, which raises the husks, stalks, and stones to the top, and these make a thick crust, and thus it continues boiling for many days, more or less, according to the strength of it, till it be fit to be drawn off, which is to be distinguished by the palate, wherein the greatest skill in making wine consists. The low wines of the plains are ready in about ten days, those of the hills in about fifteen, of the mountains of Chianti eighteen or twenty, and sometimes more; in the hastening or retarding whereof the weather has some share, so that when they are near ready, they taste them every eight hours.

N. B. *The more the wines boil, the drier they will be, the colour deeper, and the less, the sweeter and paler; and what is said above, is to be understood of red wines, which are the chief produce of this country, whilst to make their strong white wines or muscadines, they gather their Grapes carefully, and lay them three or four days or more in the sun, taking care to carry them within doors, or under shelters, in the night time, that so no dew may fall on them.*

And when they are put into the vat, they let them boil but little, five or six days at most, and then put them into the cask, shifting them from one cask to another, twice or thrice to make them become fine; and for the Verdea or White Florence, as it is called, they draw it off from the vat almost as soon as it begins to boil, and has raised the crust, and then letting it boil in the cask into which they have drawn it, thirty-six hours, or at most two days, they shift it into another, and in a few hours into a third and fourth, to prevent and check the fermentation, which gives it the sweetness it has; but then it is never perfectly fine, though some people both in Italy and England, especially among the women, are very fond of it.

N. B. *Those Grapes at the end of the bunches are weaker in quality, as well as less ripe, than those that grow nigher to the stalk, and therefore some extreme curious persons,*

persons, to make a small quantity of very choice wines, cut them off and make a wine by itself, which is much inferior to that which is made of the upper part of the bunch. This practice, though attended with trouble, may be recommended for a larger parcel, in such years as the Grapes are hardly ripe, to have some wine, at least, in perfection.

N. B. Those persons who value themselves on making the best wines, and endeavour to keep up the reputation of their vineyards and cellars, in cutting their Grapes, leave the unripe, or those that are infected with a rottenness, together, till the last, and with them make a vat or more, by themselves of vin scauro, or refuse wine, which serves for common use, for which also they mix water with the bottom of their vats, and the husks, &c. and make a pleasant brisk drink much preferable to water cyder, but the weather once coming in warm, turns it eager and undrinkable.

9. When the wines are found to be ready, they proceed to draw them off, which are now properly called wines (before which they are termed mosto, i. e. in English, wort,) for which purpose, within three or four inches of the bottom of the vat, there is a cock fixed therein. When in small barrels, they carry and put into the large butts, which in Chianti hold, some of them, seven or eight tons, but generally two or three tons, made of thick Chestnut, the staves being more than an inch and a half thick, and more than twice as high as they are long, which they never wash, but having left a gallon or two, it may be three or four, of wine in them, when they draw it off the spring or summer before, when they are about filling them again to clear them out, they send in a lad at the door, which is made in the head of the cask, to do it with a sponge, and to wash it with some new wine, and this without wiping off any of the argol, which they think preserves the wine the better. In which casks, which last many years, (and have argol in them of the thickness sometimes of three or four inches) they let them remain till they have an opportunity of selling them, taking care to keep them full quite to the bung with a wooden stopper. This is what they practise in Chianti, where the best wines are made, and whence, from those butts they are drawn into flasks, and carried at the expence of about a crown for a mule-load, to Florence, in order for exportation; but in other places they draw them off into less casks, of which wines, except some Carniguanos, and those of Val d'Arno, few or none are exported, but serve for the consumption of the country. Some of these have a pleasant flavour and briskness, though of no great body, many of which will not keep the summer over, except in cool-cellars, in the places where made, such is the nice nature of this country wines in general. Nor are the choicest Chianti's exempt, for at two seasons of the year, the beginning of June and September, the one when the Grapes are in flower, and the other when they begin to ripen, some even of the best wines are apt to change, especially at this latter season; not that they turn eager, but take a most displeasing taste, which renders them unfit not only for drinking, but even to make vinegar of, and is called the settembrine. And what is most strange, is, that one cask drawn out of the same vat shall be infected, and another not, but be perfectly good, and yet have both been kept in the same cellar too.

As this change happens not to wine in flasks, though that will turn eager, I am apt to attribute it to some fault in filling of the cask, which must always be kept full, which either by letting alone too long, till the decrease be too great, and the scum that there naturally is on all wine, thereby being too much dilated, is subject to break, or else being broken by hasty filling up, gives it that vile taste of a rotten Vine leaf. But against this there is a very strong objection, that this defect seizes the wine at a particular season, in September, over which if it gets, it will hold good for many years.

As for the time that the wines are fit to drink, the

poorer sort of people drink that of the plains almost as soon as drawn off, but from the 11th of November may be said to be its proper season.

Those of the hills are a very pleasant drink about Christmas, and during the spring, but till June the Chianti's are not esteemed to be fit for drinking, tho' they are fit for exportation in butts in December, and in the flasks and chests about the beginning of February; but if sooner shipped off in that manner, though apparently fine, there will be a sediment in the flasks.

The art of brewing wines (further than the throwing into each great butt the quantity of two or three hatfuls of the choicest Grapes they had preserved, and laid on mats in the sun for that purpose, which were picked from the stalks, and are esteemed proper for their wines to feed on, and which they call governo) was not known in Chianti (though the hosts here practised something like it, mixing the small wines of this country with the strong ones of other parts, and fining their white wines with isinglass, whites of eggs, lime, and the like, and were thought to put allum into the red wines to preserve them, and promote a thirst in their guests) till on the breaking out of the French war, an English merchant from Bourdeaux came into these parts, with a view to accommodate the wines which were made in the best parts of Chianti, and were naturally of a true bright ruby, with a pleasant flavour, and a silky softness, to the English palates, then in love with the deep-coloured rough clarets, who instructed them first in the making of black wines with a Labrusco or wild Grape, which, being mixed with the Chianti's, giving them a deeper colour and a rougher taste, and being liked in England, gave the first occasion to great quantities being sent thither every year in casks, in making of which the said gentleman was the first that instructed them, for before, their casks were, as above related, very unwieldy. This put them also (there being a demand for their wines) upon increasing and enlarging their cultivations, and making some of them in such places as the exposition was not very proper for, as also to cultivate in vineyards the said Labrusco or wild Grape, and which certainly was the most proper to mix with their other Grapes in the vat, boiling them together. So all succeeded pretty well till the year 1607, when the vintage proving very bad, and there being a great demand of their wines for England, by mixing the low wines with the high ones of Chianti, which that season were not very good, they brought these wines into such a disreputation, that they have never been able to regain their credit, though they have since, many times, had those that are good.

At present, therefore, what goes for England is chiefly in chests, and no more black wines, as used to be formerly, and these are sent just as they are made; but still in Chianti, as they have cultivations of the Brusco Grape (which however is much different from the wild one, and becomes much larger and more generous,) they continue to mix them with other Grapes, which gives the great colour as well as roughness to their wines, and is agreeable enough to the English taste.

Having thus acquainted you with what I know and can learn in relation to the making and managing of vineyards, and the wines they produce, it remains for me to add an evil, that besides the ordinary ones of hails, storms, and frosts, attends the cultivation of Vines in Chianti, and the parts contiguous, for in the plains there is no such thing, and that is a very small kind of blackish, or very dark green caterpillar, which in the month of May attacks the young shoots of the Vines, when the Grapes are in embryo, and destroys them; for which however they have a most certain remedy, which is to make a little ring of birdlime round the foot of each Vine, about eight inches above the ground, which none of these noxious insects (which I presume proceed from the earth, and are not brought in the air, as some of the like are thought to be, though these come generally with an easterly

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easterly dry wind) being able to pass, most effectually does the business; and as they in that region come almost every year, the trouble of so providing against them is become habitual to the cultivators.

The manner of making wine in Champaign, and how it may be propagated in other provinces, to bring it to perfection.

Wine is so delicate a liquor, and an aliment so proper to give strength, and to preserve health, if used with moderation, that one may very well wonder, that in most of the provinces of France, they make it with so much negligence in all those places, where it might be excellent.

The Champenois are exempted from this reproach, and whether it be from a delicacy of taste, or a desire of making an advantage of their wines, or a facility in rendering them better, they have been always more industrious to make them more exquisite, than those of the other provinces of the kingdom.

It is true, it is scarce eighty years since they have studied to make pale wine, which is very near white; but before, their red wine was made with more care and neatness, than any other of the wines of the kingdom.

I shall not enter upon the ancient or modern dispute, as to the preference between the wines of Champaign and Burgundy, but content myself with taking notice of all that the people of Champaign have invented to give the fineness and agreeableness to their wines; and by the observation that may be made therefrom, it will be easy to see that the same may be imitated in other provinces, so as to come pretty near that lightness and exquisiteness.

If these essays shall give hopes of success for the future, the wines of those provinces might be brought to perfection by degrees where they might be delicious, and where they are but poor, because they have never studied to give them that fineness.

In order to have the wine excellent, the Vines ought to be well exposed to the sun, especially to the south, and also on the decline, or in the manner of a little hill, rather than on the plain. Vines should be well chosen, and should be such as generally produce none but small black Grapes: the bottom of the soil should be good, a little stony, and not naturally moist. The grain of the soil of Champaign is very fine, and has a singular quality that is not found in other provinces.

As these kinds of lands are light, there is occasion to dung them from time to time, and to lay on new earth; but the dunging ought to be sparingly done, for too much of it will render the wine soft and insipid, and apt to be rosy; it ought to be commonly cow dung, because that is not so hot as horse dung. In strong lands it may be mingled with horse dung and sheeps dung, provided that the horse dung be so rotten, that it may be reduced to a powder, and that there be but one half as much as of the cow dung, otherwise it will burn the Vines. Let it be laid on a trench or pit, and mix one layer of dung and another of new earth, and let it lie and rot during a whole winter, and toward the month of February take from thence half a basket of every Vine, especially for each new plant, to help them to push forth. It is sufficient for a vineyard to be dunged once in eight or ten years, or an eighth or a tenth part every year.

After the dung has been carried, the Vines ought to be opened round about, and a little trench to be made round the foot of the Vine, in order to bury the dung at a proper time.

Divers persons leave it there many weeks before they bury it, but this is not the best way, for the air, the cold, or the sun, will be apt to dissipate the most subtle substance of it; but when it is neither too cold nor too hot, it may be left open eight or ten days to exhale its ill savour, especially the dung of sheep.

They give to a Vine four ordinary dressings, according to their seasons; but it is proper to take notice of

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one thing, which is scarcely observed in Champaign, which is, that they cut their Vines in the month of February, and even in January, instead of which they ought never to begin to cut them till after the 14th of February: when they are cut before, they push forth sooner, and are exposed to injury, and are sometimes killed, if any hoar frosts come presently after they have been cut; but when they stay till after the 14th of the month of February, there is no danger of their being injured by the frosts.

The covetousness of vigneron leave them to undertake the cultivation of more Vines than they well can manage, and for this reason they cut their Vines in January, which does an infinite injury to them, and to the greatest part of the plants, which they are sensible of for many years.

In Champaign they cultivate two sorts of Vines, which they call the high Vines and the low Vines. The high Vines are such as they leave to grow in those places that are less fine, to the height of four or five feet; the low Vines are those, which they do not suffer to grow above three feet high; these they inter, or ravale, according to the country term, every year, so as to leave but a little of the end to appear, which is repeated annually.

The high Vines produce plentifully, and give often seven or eight pieces of wine an arpent; the low Vines produce but little, but then the Vine is much more delicate; they often do not give above two pieces of wine an arpent, oftentimes less, seldom three, but much seldomer four.

In order that the wine may be the finer, all the wines which give the white Grapes must be taken away, and those also that give the large black Grapes, but one need not pluck these up, but graft them.

But sometimes these grafts will not succeed, which being observed, they must be plucked up, and new ones that have a root set in their room, which they chuse out of the nurseries, that are common in the country. They ordinarily purchase these plants for a pistole a thousand.

A private man that has a great many Vines, may make himself nurseries.

These plants that have a root are put into the earth, in the middle of a great hole about a foot deep, which they make with a stake, or strait mattock, or pickax, and these produce sooner than the others, which have no root. A plant that has a root begins to give wine a little the third year, indifferently the fourth and fifth, and in abundance in the following years, and so for above sixty years.

These new plants ought to be dunged the second year, and in the sixth year, and afterwards in the eighth and tenth as other Vines.

It will be to the purpose every year, to pull up part of the old plants, which take up room and produce little or nothing, and by this means a vineyard will be constantly renewed, as one may say, and in a perfect good condition.

When there are dews or humidities in May, June, and September, the vigneron must not be suffered to enter the vineyards in a morning, for the dews of these months are commonly very cold, if the sun do not draw them up, which burns the leaves of the Vines which are touched before they are drawn up.

It is very essential not to enter the vineyards at the time when there is hoar frost, or showers attended with frost, for this will certainly kill the Vines.

The vineyards must be weeded now and then, and if there be any beetles, which are pernicious animals to plants, they must be picked off and put into sacks, and burnt at some distance from the vineyard, and the ashes buried.

About the end of June, and also of the month of May, according as the vineyard is advanced, it is necessary to cut off the end of each twig, that the plant may grow no more in height, and that it may convey all its nourishment to the Grapes. It is enough, if it have two feet and a half, or three at most, above ground; all the rest is to be cut off, as must also the

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tops or ends of the young shoots, which proceed from the bottom or sides of the stocks. This ought to be done twice, thrice, or four times in a summer, according as the Vines put forth, more or less in certain years.

In the spring season they put a prop to every Vine to support it; they ought to be chosen, as much as may be, of Oak, and to procure them of the quarter or heart thereof, if you are willing to go to the charge of it. These will last above twenty years, and when they are once made sharp, they will always keep so, for when they begin to rot, they perish equally throughout, and remain always pointed. The other last scarce four or five years, and the masters must have an eye over the servants when they sharpen them yearly, that they do not cut them too much, and make them too short, and that they do not break a great many that might serve; for oftentimes in cutting off that which is rotted, they cut off two or three inches of that which is sound, which prejudices it as to duration. They call these props foot-props.

When a vineyard has been cultivated and managed during the summer after the accustomed manner, and the vintage time approaches, when they have made choice of, and prepared a new cask that will contain it, and when the press has been washed, cleaned, and rubbed over, you must be very watchful to find when the Grapes are come to maturity, for if they are too ripe, the wine will not be sufficiently strong; if they are too green, it will be hard, more difficult, and longer before it is fit to be drank.

In the provinces of Languedoc and Provence, the Grapes have too large stones, they have too many white ones; they suffer them to be too ripe, which gives them over much liquor; they let their stocks grow to be too old, and do not renew them often enough; they are planted for the most part upon too good bottoms, or too moist, and have not an aspect of the sun good enough.

To make an excellent wine of the first pressing, having first well examined the maturity of the Grapes, you ought to endeavour not to gather them but on days that are very dewy, and in hot years, after a little rain, when you can be so happy as to have it. As the Grapes are not ripe till toward the end of September, and sometimes the beginning of October, dew is rarely wanted in vintage time. This dew gives the Grapes a flower or farina on the outside, which they call azur, and inwardly a freshness, which causes that it doth not heat very easily, and that the wine is not coloured.

It is very lucky, if there chances to be a misty day in dry years, which now and then happens, for the wine is not only thence more white and delicate, but the quantity is by much the greater, being augmented by near one fourth part. A private person who has but twelve pieces of wine, in gathering his vintage in a morning which has the sun without dew, will have sixteen or seventeen, if the morning be misty, and fourteen or fifteen if it has no mist, but yet has a good dew; the reason of this is, that the dew, and above all, the mist renders the Grapes tender, so that the whole in a manner turns into wine.

The wine produced from the Grapes that have not been warmed the moment they are cut, will still remain much paler, whereas, when the sun has warmed the substance of the Grape, it will become more red by the motion of the parts, but the quantity will be lessened either by reason of transpiration, or because the rind has been thickened and hardened by the sun, whereby it yields its juice with more difficulty. This, which experience has taught, is of so much the more concern, by how much the more certain it is. They agree in Champaign, that the wine which they call river wine, is ordinarily paler than that of the mountains, but they do not give the reason for it. I believe the vineyards that are near a river enjoy all the night a fresh air, which the river exhales, whereas the vineyards of mountains do not respire, during the night, that warmth which proceeds from the exhalations of the earth, and it is that which makes the colour more or less; also when the years are very hot, they cannot, either to those of the rivers, or of the mountains, warrant the colour; and when the years are cold, neither the wines of the mountains nor those of the rivers are coloured; the reason is the same, because the wines of the rivers are more soft, forward, and sooner fit for drinking, than the others that are harder, more heady, and later fit.

They gather not all the Grapes without distinction, neither at all hours in the day, but they chuse the ripest and bluest; those are the best, and make the most exquisite wine, whose berries grow not too close together, but are a little separated, whereby they ripen perfectly well, for those that are close joined together never ripen thoroughly; they cut them with a small crooked knife, with as much neatness and as little of the tail as they can, and they lay them very gently on the baskets, so as not to bruise one Grape.

With thirty Grape-gatherers they will run over a vineyard of thirty arpents in three or four hours, to make one first pressing of ten or twelve pieces. In wet years great care should be taken not to put any Grapes that is spoiled into the baskets, and at all times you must be very careful to cut away the rotten Grapes, or those that are bruised, or quite dried up, but you must never pull them off the bunches.

They begin the gathering of Grapes half an hour after sun-rising, and if the sun is not clouded, and is a little hot about nine or ten o'clock, they leave off gathering, and make their sack, which is one of the first pressing, because after this hour the Grape being warm, the wine will be of a red colour or tint, and will be a long while very heady.

Upon these occasions they get a great number of gatherers, to be able to make up a sack for pressing in two or three hours; if it be overcast, they may gather the whole day, because the Grape will preserve its freshness upon the stock.

The gatherers and pressers ought to take great care that the Grapes be neither foul nor heated when they are pressed, and also that the Grapes have their flower under the press.

When the press is near the vineyard, it is easy to prevent the wine from having a colour, because the Grapes may be carried gently and neatly in a little time; but when they are two or three leagues off, they being obliged to send the Grapes in casks and in carts, to press it as soon as may be, it is hardly to be avoided but that the wine will be coloured, except in some very moist and cold years.

This is a certain principle, that when the Grapes are cut, the sooner they are pressed the more pale and delicate is the wine; for by how much the more wine stands upon the marc, the redder it is, so that it is of great importance to hasten the gathering of the Grapes and pressing of them.

The presses of Champaign are very commodious. The particular persons that have many vineyards of their own, have them in or near the same vineyards; in small places the presses are bannaux, which are of different sizes and fashions. An exact description of these several presses will be inserted in the article of WINES.

The small ones are about seven feet and a quarter, the middle ones about ten or twelve, the large ones fifteen or eighteen; the least, which they call etiquets, cost seven or eight hundred livres; the second, which they call a cage or a teiffons, about two thousand franks; the large ones a thousand crowns, and sometimes more, according as the wood is cheaper or dearer in certain places. In Languedoc and Provence, where the wood is scarce, these sorts of presses cost a very great price, and but few persons are in circumstances to be at the charge of them.

When the Grapes have been put under the press, or on the marc, they put three great rods or poles of ten or twelve inches round upon them, one at either end in length, and the third in the middle, on the

same side; these at the extremities serve to describe the lines which they ought to follow with their cutting shovels in cutting the marc, the substance squeezed on two sides; after the cut is made, they lay upon these poles and on the Grapes, planks of the size of the press; and upon these planks half beams of eight or nine inches square, which they call *moyaux*, at a foot distance one from the other; they put four or five rows of these *moyaux* across, one upon another, which elevate it with the bag about four or five feet, and they let down upon the whole three or four great beams of an immense weight, which are placed in the middle of the press across, and borne up at one end by two strong side beams, which are sunk fifteen or twenty feet in the ground, and which are fastened to the bases which cross them; at the other end there is a cage as they call it, or a wheel with a screw, to raise or lower these great beams upon the *moyaux*, and thus to press the Grapes; then they presently raise, by the means of a screw, the end of the trees on the side of the wheel, or of the cage, which lowers the other end of the cheeks or side beams; then they drive with a great mallet two or four wooden quoins between the notch, which is in the side beams or cheeks; and these beams are also lowered to keep them in their position, and to prevent them from rising: and after this they lower the other end by the aid of the screw, which serves also to raise it.

They use in these presses large steel shovels, about a foot in breadth, and one and a half in depth, very heavy, and sharp at the bottom, to cut the marc of the Grapes easily at the four sides.

The first time they lower the great beams upon the Grapes, they call the wine that runs out, the wine of *goute*, because it is the finest and most exquisite in the Grape. This wine is very thin, and has not body enough: some call this first pressing *l'abaissement*; this must be done with a great deal of dexterity and briskness, that the beams may be raised immediately, to thrust back to the middle instantly all the Grapes which are slipped to the sides of the press, that they may be briskly pressed the second or third time. They call these two other lowerings of the beams the first and second cutting; they must be done in less than an hour, if you would have the wine very pale, because time is not to be given the Grapes to heat, nor the liquor to remain upon the marc.

They ordinarily mix the wine of the *abaissement*, or first lowering, with that of the first and second cut; and sometimes, but very rarely, according as the years are more or less hot; and thence they call a wine of the first pressing fine.

Some reserve one or two *carteaux* of the first taste, which is that of the first lowering, by itself; but it is too small or thin, and has not a sufficient body for keeping for transportation.

There are some skilful persons who pretend, that the first lowerings of the wines ought not to be mixed but with those of the first cut, because that is much more delicate than that of the second or third; and that besides there is time enough to mix them afterwards, if they are found to be too thin and pale enough; and the rather because there is no remedy, if it be done at the first.

At every cut they raise the great beams, and they take away all the *moyaux* with the planks, and the rods that are immediately on the Grapes, or upon the marc; with these steel cutting shovels they cut the marc on four sides, and they cast down with their wooden shovels that which is cut, and spread it even all over the square, to the end that it may not disperse so easily, that is to say, in those presses which they call *etiquets*; they take care, that the wheel which is upon the middle may be made to bear, especially upon the rammer, over all the breadth, in such manner that the bag may be equal.

Instead of the presses, a cage, or *teissons*, as the beams bear more upon the side of the wheel, than on the corners, there must needs be more of the marc when the bag is placed sloping toward the wheel than

toward the side of the quoins, it will be easily comprehended by viewing the descriptions of the different presses. It is also to be observed, that every time they cut the Grapes, or the marc, they raise up the bag, because it has always a certain elevation, in such sort, that it is one third less at bottom than at the top.

The second cut is more plentiful than the first lowering, and the first cut; because the Grapes begin to be well bruised, and they do not slip so much to the sides.

The wine strains from the press into a puncheon having the head staved out, or some other large vessel prepared for the purpose, and sunk into the ground on the fore-side to receive it; it appears at first drawing to be a little upon the red, but it loses this little of its colour according as it is boiled, and as it clarifies itself in the tun; and it becomes perfectly white, especially when they have pressed the two first cuts with much dispatch; but principally when they have gathered the Grapes during the dew, or in a shady time. Although these wines are white, they call them gray, because they are made only of black Grapes.

If the year be hot, and the wine of the third cut has a colour, it must be mingled not with that of the foregoing, but with that of the fourth; and sometimes, tho' very rarely, with that of the fifth. They are not in so much haste for these cuts as for the first; they make an interval of a good half hour between the one and the other. The wine that comes thence has more of colour than this, which they call the *partridge's eye*, or the wine of the cut; it is a strong wine, pleasant, fine, good for an ordinary, but is better when it is old.

When the wine of the fourth cut is too deep, they do not mingle it with wine of the first or second cut, but they observe to mingle it with wine of the fifth, sixth, or seventh cut, which they call wine of the press, which is of a deep red, pretty hard, but fit for household drinking; but when they are not in haste, they leave an interval of an hour and a half between every one the three last cuts; as much to give time to the wine to strain insensibly, as to give the pressers time to sleep or rest themselves, for the fatigue is very great, they being obliged to carry it on night and day for about three weeks. The pressers of Champaign press the Grapes so hard, that after they have done, the marc is as hard as a stone; they put this marc into old casks with the heads out, and they sell it to people who draw from it an *aqua vitæ* of a very bad taste, which they call *aqua vitæ* of Aixne; but it is good for a great many purposes.

Those who have many vineyards also make two, three, or four first pressings of the fine wine, by choosing always the most delicate and ripest Grapes for their firsts; these are always much superior the one to the other for goodness and price, so that if the wine of one of the first pressings sells for six hundred livres a queue, that of the second will not sell for above four hundred and fifty, and that of the third two hundred and fifty, although all the Vines are of one and the same vineyard.

In every first pressing there are ordinarily two thirds of fine wine, one half third of wine of the cut, and one half third of the wine of the press; thus one *cuvée* of five or six pieces of wine, will consist of nine or ten of fine, three or four of the *taille*, and two or three of the press.

Of the common black Grapes, which remain after the first, second, or third *cuvée*, they make one with those that are not very ripe, and which they call *verderons*, they make of the whole a wine pretty high-coloured, which they sell to the country people, or that serves for their domestics; they also leave these Grapes two whole days in a great tub before they press them, to the end that the wine may be the redder; and they mix all that comes from the different *tailles* of this vintage together.

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The white Grapes don't come into this cuvée; they leave them upon the stock till toward All Saints-day, or sometimes till toward the eighth or tenth of November, (at which time the mornings are cold) to make of it a vin bourra, as they call it, i. e. a new and sweet white wine that has not worked, which they sell while it is quite hot.

This wine is still the better when the Grapes have been pinched by the white frosts of October and November, or at least very cold mornings. A little rottenness in these Grapes does no harm; you need only take care to give the wine time to throw out the filth by the ferment, and purify.

This white wine may be mixed with the wine of the taille, if you please, when you have an opportunity of selling it presently after it is boiled. This makes a very good wine to drink, is pretty pale, and has a good body.

All these fine wines ought to be put into a new cask, as also should those of the taille; but the red wines, the green, and those of the press, may be put into an old cask, but it ought to be a very good one.

You must never rub the tuns over with brimstone, you should only wash them in common water a little while before they are filled, and give them time to drain well: some handfuls of flowers or Peach leaves may be mingled with the water, and they pretend that this will do the wine good.

In Champaign they rarely put it in any thing but pieces, cateaux and cades.

The river measure is different from that of the mountains: the pieces of the rivers contain about two hundred and ten Paris pints (a Paris pint is equal to an English quart;) the carteau a hundred and ten; the pieces of the mountains contain about two hundred and forty pints, at the least two hundred and thirty Paris measure; and the carteau a hundred and fifteen, or a hundred and twenty.

They mark regularly with chalk every piece, and every carteau, to denote the first, second, or third cuvée; the wine of the cutting of the press, the white wine, and the green; they also write the name of the vineyard from whence the Grapes came.

A few years since, some private persons in Champaign attempted to make wine as red as that of Burgundy; and they succeeded pretty well as to the colour: but in my opinion these sorts of wines do not come up to those of Burgundy, in that they are not so soft, nor so agreeable to the palate: nevertheless many persons call for these wines, and some esteem them the best.

And as those gray wines are a little fallen, there has been made some years past, a great deal of red Champaign. These wines do well for Flanders, where they are frequently sold for those of Burgundy.

Of all these wines, there is none better for health, nor more agreeable to the palate, than the gray wine of Champaign, of the colour of a partridge's eye, or the wines of the two first tailles of a first pressing in pretty hot years.

This wine has a body, a tartness, a headiness, a balsamickness or perfume, a quickness and delicateness, that exceeds all the most exquisite ones of Burgundy. And that which should engage one to drink it, is its lightness, which makes it strain and pass quicker thro' the body than any other wine in the kingdom. It is a mistake to be of opinion, that the wine of Champaign can give the gout. I have scarce ever seen one gouty person in this whole province, and there need be no better proof.

To make good red wine in Champaign, the black Grapes ought to be gathered in the heat of the day; care is to be taken to chuse them well, and not to mingle with them the Grapes of the tall Vines, nor the green ones, or those that are partly rotten; to let them be two days in one tub, where the liquor grows red by the heat that it contracts there: some hours before it is put into the press, it ought to be trampled with the feet, and the juice to be mingled with the marc; without this the wine will not be of

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a sufficient redness. If it be let stand more than two days in the tub, it will taste too much of the stone. If it be mingled with the wine of the press, it will be too thick, too hard, and too unpleasant.

The wine of the first pressing being finished, and the vessels marked, they set them in a row in a cellar or court yard: those who have a great deal of wine and are good œconomists, take great care to gather the scum that comes out of every vessel, while the wines ferment, by the means of a kind of tin funnel, made bending downwards, which lets the scum fall into a wooden bowl, which is placed between two casks; they afterwards put these scums into the wines of the press, but nevertheless there are but few that use this piece of œconomy.

They let these gray wines stand to ferment in the casks ten or twelve days, because these wines throw out their ferment so much the more or less slowly, by how much they have more or less warmth, or as the years are more or less hot.

After the wine has done fermenting, they stop up the vessels at the great bung-hole, and leave on the fore-side an opening, about the bigness of a French farthing, by which one may put in his finger; this they call le broqueleur; and they stop this up ten or twelve days after, with a wooden peg, about two inches long, for the more readily taking it out, and putting it in.

All the while the wines are fermenting, the vessels are to be kept full, to give them an opportunity of casting out all that is impure. In order for this, they must be filled up every two or three days, within a finger's breadth of the bung; after they have been bunged up, they must be filled up every eighth day, at the little hole, for the space of two or three weeks more; and after that, once a week for a month or two; and after that once in every two months, as long as the wine remains in the vault, if it be there for years.

When the wines have not body enough, or are too green, as it often happens in moist cold years, and when they have too much liquor, as in hot and dry years, three weeks after the wines have been made, they must be rolled in the casks five or six turns to mix them well with the lees; and this must be continued every eight days for three or four weeks. This mixing of the lee with the wine being repeated, will strengthen it, soften it, ripen it, render it more forward, and make it fit to drink in as short a time as if it had been transported from one place to another.

The wines must be let stand in the cellar till toward the 10th of April, when they carry them down into the vault; but as soon as it begins to be cold in autumn, they are to be carried up again into the cellar: it is of consequence to be observed upon this subject, that the wines ought always to be in cool places, and never to suffer heat; and as the vaults are cooler in summer, and warmer in winter than the external air, as soon as it begins to be hot, the wines must be carried down, whether they be in pieces or in bottles, into the vaults; and when it begins to be cold, they must be carried up into the cellar.

There has been nothing better invented and more useful, than the manner of drawing off wines. Certain experience convinces, that it is the lee that spoils wines; and that they are never better and more lively, than when they have been well drawn off; whether you would bottle it, or keep it in pieces, it ought always to be drawn off, out of one vessel into another, at least twice into another vessel well washed, leaving the lee in the former.

You should draw off the wines the first time towards the middle of December, the second towards the middle of February, and to fine them in March and April, eight days or thereabouts before you bottle it. For every piece of wine, you must have of isinglass, that is the whitest, of the weight of a crown of gold, weighing two deniers fifteen grains, or sixty-three grains. They take so many times the weight of a crown

crown of gold, as they have pieces of wine to draw off; they put this quantity of isinglass in one or two pints of the same wines, in a bucket, for a day or two, to give it time to dissolve; others put it in a glass, or a pint of water, according to the quantity, in order to hasten its dissolving, which is always difficult to be done; some mix it in a pint of spirit of wine, or excellent aqua vitæ. When the isinglass is grown soft, they beat it well to divide, and distribute it; then, when the parts begin to separate, they put in the bucket or vessel, in which this dissolution is made, so many pints of wine as they have casks or pieces to draw off; then they beat the isinglass again and pass it through a strainer, the holes of which should be very small; they often pour in of the same wine to dilute it well; and when there remains nothing in the strainer, they pass all the liquor over again through a linen cloth, and squeeze it very well; and afterwards they put one good pint or less into each cask, and half a pint into each carteau.

They stir the wine in the piece with a stick about the middle, without suffering the stick to go any lower. It is sufficient to stir the wine for the space of three or four minutes.

A certain private person has newly contrived a quicker method of dissolving this isinglass; after it has been steeped one day in water, he melts it in a skillet upon the fire, and reduces it to a ball, like a bit of paste, and afterwards put it into the wine, where it distributes itself with less difficulty. After what manner soever it is dissolved, care ought to be taken not to put in too much liquor, and not to put more than a proportionable quantity of water or wine to that of isinglass.

The isinglass works itself ordinarily in two or three days, though sometimes it does not clarify the wine in six or eight; but nevertheless, you must wait till the wine is clear before you change the vessel. In the winter the seasons are oftentimes so improper for this, that there is a necessity of putting isinglass a second time into the piece, but then you must not put in more than the quantity before mentioned; but when it freezes, or the weather is clear and cold, the wine will clarify itself perfectly well, and in fewer days; it has a colour more lively and brilliant, than when it is fined and drawn off in faint moist weather.

As soon as the wines are clear, they are to be drawn off, and the vessels changed. Four or five new casks are sufficient to draw off two or three hundred pieces of wine; for when they have emptied one piece, they take out the lee, and put it into the old casks, wash it, and it serves to draw off another into it.

Nothing is more curious than their contrivance in Champaign, to shift their wines without displacing their casks. They have a leathern pipe like a gut, four or five feet long, and about six or seven inches in circumference, well sewed with a double seam, that the wine may not run through; there is at both ends a cannon or pipe of wood, about ten or twelve inches long, and about six or seven in circumference at one end, and about four at the other; the great end of each pipe is set in a leathern pipe, and well bound with strong twine on the outside, that the wine may not run out; they take out the bung that is at the top of the tun that they would fill, and drive the wood of the pipe in with a wooden mallet, which they beat upon a sort of chin cloth, that is fixed to each of these pipes, which being fastened about two inches within an inch or less of the great end, and which loses itself insensibly in going towards the small end, they set a large siphon of metal below the cask they would empty, and also put into this siphon the small end of the other pipe of wood, which is fastened to the leathern pipe, and afterwards open the siphon, and without the help of any person, almost the half of the full vessel passes into the empty one by the weight of the liquor; and when it is come near the level, and will run no longer, they have recourse to a kind of bellows of a very particular construction, to

force the wine from the cask they would empty, to pass into that they would fill.

These kinds of bellows are about three feet long, and a foot and a half broad, and are made and shaped in the common manner to about four inches of the small end; but from this distance the bellows have three or four inches in breadth. In the inside of this place, the air passes only through one great hole of an inch bore: near this hole, on the side of the small end of the bellows, there is a piece of leather like a tongue or sucker of a pump, which is fastened there, and lies close against the side of the hole and the mouth, so that when the bellows is lifted up to take in the air, the air that has passed once through this hole, and has entered into the cask, cannot return back into the bellows, which takes not back a new air, but by those holes below to fill it again.

The end of the bellows is different from that of others, being closely shut up with a nozel of wood of a foot long, which is jointed in, glued, and very strongly fastened by good pegs at the end of the bellows, to conduct the air downwards. The nozel is round, and thick without, about nine or ten inches in circumference at the top, and diminished insensibly towards the small end, that it may enter conveniently into vessels by the bung-hole, and also to shut it up so close, that the air can neither get in nor out any way.

This nozel enters for this purpose two inches near the level at the end of the bellows, and is made in a half round at the top, that it may be beaten in with a wooden mallet, and forced into the cask; there is, about two fingers length below the upper end of this nozel, a hook or brace of iron of a foot long passing through an iron ring, which is fastened with nails to the nozel, in order by this hook to fasten the bellows to the hoops of the cask, without which the force of the air would drive the bellows out again by the bung-hole, and the operation of emptying the broached vessel would not be performed.

The mechanism of these bellows thus described, is easy to be conceived. The air enters by the holes below in the common manner; it advances toward the end, according to the degree that the bellows are pressed, there it meets with a pipe that causes it to descend downwards; but to hinder it from rising up again, as it would do, when the bellows were opened to give it a new air, there is in this space a sucker or tongue of leather, which, as has been said, is on the inside of the hole at about three or four inches from the end of the bellows, which shut up the hole according as you would have it take in again a new air; this new air pushes still gently, in pressing the bellows in the pipe, because this tongue opens according as it is forced by the air; thus there continually enter a new air into the cask, without being able to get out, because it finds itself close stopt by the same pipe that carries the air into it, and the tongue hinders it from getting out again.

The force of this air which continually pushes in, pressing strongly upon the bellows, presses equally the superficies of the wine over the whole length of the piece, without causing the least agitation in the wine; and the force causes it to pass down in the pipe of leather, from thence into the other cask that is to be filled, where it rises, because the air is driven toward the bung-hole, which is open.

The bellows push all the wine in the cask to about ten or twelve pints, or thereabouts, which is known when they perceive the wine to hiss in the siphon; at which time they take from the two casks, the two pipes that have been forced into them, and which are joined together by the leather pipe, and nimbly stop up the hole at the bottom of the piece with a bung of Oak made round, a little sloping, and drive it with a mallet; from the other cask, that has been emptied, they pull out the cannon or pipe of wood from the fountain of metal, and leave it to drain gently some pints of clear wine into a vessel that receives it.

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They observe attentively every moment, in a clear glass, if the wine be neat; and when they perceive but the least thickness, without waiting till it appears foul, they stop the fountain, and take it away immediately, and turn out into a bucket that little wine that remains in the piece. That clear wine that has drained out of the fountain, they put into the cask that they have been filling; they use for this purpose a funnel of tin, the tail of which is about a foot long, to the end that the wine that passes through it, may not cause any agitation in that of the piece; and that there may not any filth pass into the wine, there is, toward the bottom of the funnel, a tin plate pierced through with small holes, which prevents any thing gross from passing through into the piece.

They put together into a separate cask, all the remainders of the empty pieces; presently after they have emptied one, which they do in less than half an hour, they wash it with a bucket of water, let it stand to drain some moments, and then fill it with another that is to be drawn off.

After the wine has been emptied out of one vessel into another the first time, they draw it off a second time, at the time we have before mentioned; sometimes they are obliged to do it a third time, to give it a lively colour, if it has it not already; but four days before they change the cask, they give it a frizure, as they call it, and put in it one third part of the ordinary quantity of isinglass.

The most experienced persons shift their fine wines out of one vessel into another, as often as they change the vault or its place, as well when they carry it down into the vault, as up into the cellar, according to the different seasons: I have known when, in four years time, they have drawn it off twelve or thirteen times; and they pretend, that this preserves and sustains the wine, and that it has been the finer and more delicate.

Their opinion is, that the wine is continually forming a fine lee, which gives it the colour; and that to preserve it of a good white, it must be often shifted out of one vessel into another, if it be not put into bottles; and that there is no reason to fear, that the wine will be weakened by this means, because the oftener it is removed, the oftener you give it new vigour, and the oftener it is drawn off, the more lively and brilliant is the colour.

And although I have said they should not brimstone their casks, they do not fail to use a match of brimstone the first time they change their vessels; they mingle a piece of thick linen cloth in the melted brimstone, and they cut off a bit for each cask of fine wine about the bigness of one's little finger, and one as big again for every piece of common wine; they light it, and put it under the bung of the piece they empty, before they have recourse to the bellows; according as the wine descends, it draws along with it a small scent of the brimstone, which is not very strong so as to make it perceivable, and that only leaves what will give it a liveliness of colour; the same may be done the second time, when they change the cask, if it has not taken the scent the first time, otherwise it ought to be drawn off the second time without a match, to cause it to lose the scent of the brimstone, which it ought never to have.

The wines that are thus clear and fine, keep very well in the cask for two or three years, and hold their goodness in the vaults and cellars, but especially the mountain wines that have a good body; those of the river lose their quality in wood, and they ought to be drank in the first and second year, or else they must be put into bottles. This wine will keep very well four, five, or six years in glass bottles.

The use of round bottles is very common in Champagne; they having plenty of wood in the province, have there set up very good glass-houses, which they seldom make use of but in making these bottles, which are about six inches high, and four or five in the neck. These bottles contain ordinarily a Paris pint, or half

a glass less. They sell them commonly for twelve or fifteen franks a hundred. They have a certain quantity in every house. Before they enter upon a piece of wine to drink, they put it into bottles well washed and drained, in order to have the wine of one piece equally good.

When they have a mind to draw off a piece of wine into bottles, they put a little siphon of metal into the cask, which is bent downwards, to strain it into the bottle, under which there is a tub or bucket to catch the wine that shall run over. They stop up every bottle carefully with a good well chosen cork that is not worm eaten, but that is solid and close. These sorts of fine corks cost fifty or sixty sols a hundred. There cannot be too much care taken in the chusing corks, lest the wine spoil in some of the bottles, when the corks are defective; therefore great care should be taken in the chusing them, when you would draw off fine wines into bottles, whether it be for keeping, or to be sent abroad.

When bottles are used that have been made use of before, they should be washed with leaden shot, and a little water to fetch out the filth that shall remain on the bottom of the bottles; but it is much better in the room of them to use small nails, because they perfectly take off all that which sticks to the glass.

When all the bottles that suffice to empty one cask are filled, they tie the mouth of the bottle over to the neck with a strong packthread; and if it be a fine wine they commonly seal it with Spanish wax, that the wine may not be changed, nor the bottles by the domestics; and some persons have their coats of arms made on the bottles, which does not enhance the price above thirty sols per cent.

When all the bottles are well stopped, tied down, and sealed, they ought to be set in a vault or cellar, upon sand two or three fingers depth, and laid sideways, leaning against one another; when they are set upright, they form a white flower upon the wine at the top, in the small empty space that is between the top of the mouth of the bottle and the wine; for the bottles ought never to be filled up to the top, but there must be left a small empty space of about half an inch, between the wine and the end of the cork.

If this was not done, the wine would set a working in the different seasons of the year, and break a great number of bottles; and it does, notwithstanding, break a great many, in spite of all the caution that can be taken, and more especially when the wine has a great deal of heat, or is a little tart.

In some years the wine grows ropy in the bottles even in the vaults, so as to rope when it is poured out as if it had oil, so that it cannot be drank. This is a malady that seizes the wine, that has stood several months without being removed from one place to another. If it be set in the air, it will lose more of its ropiness than it will if left in the vault. It will recover itself, if set in a very airy granary, better than it will oftentimes do in six months in a vault.

When one is obliged to drink a ropy wine, if he shake the bottle strongly for the space of half a quarter of an hour, and then uncork it immediately after he has done shaking it, the bottle being a little inclined on the side, will cast out presently half a glass of froth or scum, and the rest of the wine will be drinkable, whereas otherwise it would not be so.

For about forty years last past, the taste of the French has been determined for a frothy wine; and this they used to love, as one may say, even to distraction. They have begun a little to come off from that for some years past. Their sentiments are much divided as to the opinion of this kind of wine; some believe that it proceeds from the force of the drugs they put in it, which makes it froth so strongly; others attribute it to the tartness of the wines, because the greatest part that do froth are extremely tart; others attribute this effect to the moon, according to the times in which these wines are bottled.

V I T

It is true, there are a great many wine merchants, who, seeing the great fondness that there is for their frothy wines, oftentimes put in allum, spirit of wine, and pigeons dung, and a great many other drugs, to make it froth extremely; but it is certain by experience, that the wine froths when it is any time bottled from the vintage to the month of May. There are some who pretend that the nearer the vintage time the wine is produced when it is bottled, the more it froths. Many do not agree to this opinion, but nothing is more certain than that there is no time in which the wine froths more, than about the end of the second quarter of the month of March, and this always happens toward the holy week. There does not need any artifice at all, one may be always sure to have wine perfectly frothy, when it is bottled from the 10th to the 14th of the month of March; of this there is such reiterated experience, that it cannot be doubted.

It is good to know that the wine does not froth presently after it is put in bottles; it must be at least six weeks, and sometimes six months, before it froths well. If it is to be transported, you must give it near a month of the vault, especially in the summer, to recover its remove.

But as wines, especially the mountain wines, are not ordinarily bottled in the holy week, because they are then too green, or have too much hardness, especially if the year has been cold and moist; or too much liquor expressed, if the year has been hot, the most sure and advantageous way to have exquisite wine, that is perfectly frothy, is not to bottle it till the rise of the sap of August. It is certain by experience, that it froths excessively when it is bottled from the 10th to the 14th of August, and as it will then have lost the tartness or greenness of its liquor, one may be assured in bottles to have the ripest and most frothy wine.

There has been another experiment tried, which is, not to bottle the mountain wine till the holy week of the second year, that is, eighteen months after the vintage; and it has been found that it froths sufficiently, but less by half than that which has been bottled in the rising of the sap of March the year before.

It is not believed that the river wine, which has a less body than that of the mountains, can froth so much in the second year. When one would have wine that will not froth at all, it should be bottled in October or November, the year after the vintage; if it be bottled in June or July, it will froth slightly, though but a little, if any thing at all.

To find in the wine of Champaign all the merit that it ought to have, it should be taken out of the vault not above half a quarter of an hour before it is drank, and it must be put into a bucket, with two or three pounds of ice; the cork should be opened and put in again lightly, which, if it be not done, the wine will break the bottle, or will not grow cool, if it were not unstopped, and it would evaporate itself, if it remained quite open. When the bottle has been half a quarter of an hour in this ice, it must be taken out, because the ice would otherwise chill it too much, and make it lose its briskness. This wine will be excellently good, and of a delicious flavour, when it has been a little affected by the ice, but great care must be taken that it may not be either too much or too little.

As these wines, especially those of the same year, work continually in the vaults and cellars, and still more in bottles than in pieces, according to the different seasons, and the divers impressions of the air, it ought not to be surprising, if the same wine, especially the new, oftentimes appears different in taste. We find a wine potable in January and February, which will seem hard in March and April, because of the rising of the sap, which agitates it more; the same wine in June and July will appear entirely soft, and in August and September we shall find it hard again, which one shall not be able to perceive any

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thing of during the preceding months, because the rising of the sap in August will put the parts in a great motion. This effect motion will have on the river wines of the year, but oftentimes the wines of two years from the mountains will appear more mellow, more or less exquisite, more or less forward, according to the different motions it has received by the different impressions of the air, which will vary more sensibly in the different seasons of the year.

There ought to be a very great attention to keep the wine continually in cool places, for, as nothing does it more hurt than heat, it is of the greatest importance to have good cellars, and excellent vaults. No part of the world has so good vaults as those in Champaign, which is the reason it is so difficult to find any where else so good wines as those of this province.

Those who would lay up a stock of wine, and are able to keep it two or three years, or whose business it is to send it into other far distant provinces, or to foreign countries, ought to chuse the mountain wine; for as it has more body, it will better bear transportation than those of the river; and besides, the English, the Flemings, the Dutch, the Danes, and the Swedes, desire these strong wines that can bear the transportation, and hold good for two or three years, which the river wines will not do.

The most noble river wines are those of Auvillers, Ay, Epernay, Pierry, Cumieres; those of the mountain are, of Sillery, Verzenay, Taissy, Mailly, and above all, those of St. Thierry have the most reputation. The last has for a long time had the greatest name, and been the most called for, and one may venture to say, that it comes nothing behind the best wines of Champaign.

By all the observations which have been made on what is practised in this province, in cultivating and ordering the Vines, and in fining off the wines, in bottling and carrying them up and down into cellars and vaults, and from vaults to cellars, it will be found that even persons of good taste, in the provinces of Burgundy, Berry, Languedoc, and Provence, who are yet very curious and delicate in making wines, especially for their own tables, know not so well how to bring it to perfection, as those who are accustomed to make it in this province; for though their wines have not the tartness of those of Champaign, yet they are able to make them more clear, fine, and light. They might therefore try if they would not be preserved better in drawing them off from the lee, than in letting them lie on it, according to their usual custom, which some are of opinion is absolutely wrong. They should chuse and pick, in the fresh of the morning, their finest black Grapes, and those whose berries adhere the least together, because they are the ripest, and they should observe to leave as little stalk to them as may be; and with regard to pressing, in which they are usually faulty, they should immediately, as soon as carried, trample every load of Grapes successively as they are brought in, and collecting the first, must put it in new casks of a less size; and when they have finished treading the remainder of each carriage, they should put them into the common vat, but let them not remain there so many days as they are generally used to do, that so their common wines may be thinner, and less strong. By this management they might make four, five, or six pieces of fine wine, more or less, according as they shall find it good, and then they should take the same care, as has been said those of Champaign do; and if they would be content now with a less produce, they would have a far greater quantity the following years, and would be continually bringing it to a still greater perfection, as they improved more and more in experience. In those countries, where they can conveniently have presses, they should make them.

Their wines would be more delicate, more light, and less coloured, by this attention, and with half the fining, would be better for transportation, in drawing them

them from the lee, and especially if they are put into bottles.

All these observations which we have made, will be of great use to those persons who would improve their wines, or desire to drink delicious liquor; but such persons must remember that they ought, above all this, to study to have good vaults, and those which are coolest in the summer, and warmest in the winter, are ever the best.

It may seem to many persons in this country that we have been too prolix in the account we have given, but these observations are not designed for those who are acquainted with the practice already, but for such persons as are wholly ignorant of these things, and who are so far from taking any pains in the ordering their wines, that it is a pain to them to conceive the greatest part of those things which I have taken notice of to be necessary, and who cannot be persuaded but that they observed every thing requisite to the proper management of wines, as exactly as those of Champaign do.

They practise nothing in Champaign, which may not be perfectly imitated in other places; the drawing off the wines, the manner of fining them, and putting them in bottles, &c. is all equally possible, and also easy. Many persons might enrich themselves, if they would set themselves about it, with the help of these observations, and of those they might make themselves, to bring their wines to perfection, and instead of selling them for one or two sols per pot, as they ordinarily do, they might sell them for upward of eight or ten. They would have the satisfaction of augmenting their income, and see their wines sought after, and they would be able to sell them not only at home, but also to transport them into foreign countries, because their situation is more favourable to send them by sea, than that of the Champagnois, who are obliged to transport theirs upon waggons, and by rivers, into Germany, and the farthest parts of the north.

Perhaps some critics will object the difference of climates, which will not permit the same culture of the same plants, which, by their different qualities, require particular managements. This way of reasoning might have place, if I had pretended to speak to a people who studied to order the Vines with great attention, and to give them a fineness, but I have it chiefly in view, as I have had in collecting these different observations, to instruct those people who are entirely ignorant of the method used in those countries where they are accustomed to make excellent wines, as well by reason of the goodness of the lands, and the warmth of the climate, as by the industry of those who inhabit them.

In Champaign, where their Grapes do not ripen but with difficulty, because their country is cold, they make pale and white wines, the wines truly gray, which are a little coloured, and the velvet wines: Why cannot they make all these sorts of wines in Berry, in Burgundy, in Languedoc, in Provence, &c.? The warmth of the climate will not permit wines to be made perfectly white with black Grapes; they will have a little colour, and they will not thence be less exquisite than those they have made these fifty years in Champaign, and in the main are better in taste, and better for health, than those wines that are perfectly white, which cannot be used but after dinner.

A dissertation on the situation of Burgundy, and the wines that it produces. By Mr. Arnoux.

The town of Beaune is the center of Upper Burgundy; it is situate in a territory the most fertile and serene in France; it is all round encompassed with cities, among which is Autun the ancient capital of the Gauls, Dijon the capital of the duchy of Bourgogne, Nuis, St. Jean de Laune, Verdun, Seure or Bellegarde, Chalons on the Saone, Arnay le Duc, Sanlieu,

Flavigny, and Semeur. Beaune is placed almost in the middle of these towns, which are not above eight, nine, twelve, twenty-one, or twenty-four miles at the farthest, to be as it were, a nurse to them all, in distributing plentifully amongst them the liquors which it produces.

All the learned are agreed unanimously that it is the ancient Bibracte, of which mention is made in Cæsar's Commentaries.

Cæsar, not having above two days provision for his army, and being not above thirteen miles at the most from Bibracte, the biggest, richest, and most fertile city of the Eduans, thought proper to march thither to procure provision for his troops, and that is the reason he quitted his way to Switzerland, and came to Bibracte. Com. Cæs. Lib. de Bel. Gal.

But to return to the town of Beaune: this town cannot pretend to glory in these ancient remains of antiquity, which the air consumes, and time reduces to dust; it only glories in its good wines, which every year bring to the citizens new riches. However, it has been within an age past a strong place, and is still surrounded with a large ditch, which runs into the river Burgoise; this takes its source at about half a mile from one of its hills; it is also encompassed with a rampart flanked with some towers, and five great bastions. The ditch which encompasses the town, is above a mile and a half in circumference; the citizens there enjoy almost continually a pure air, and a clear sky, being equally about a hundred leagues off from the Mediterranean and the ocean. The waters are, as one may say, in suspense, when it is about to determine its course. There is also a great body of water in its neighbourhood, which is seen in all the charts of France under the name of the Pond of long Extent. It is the opinion of some persons, that this partakes of the waters of both seas.

This town can count fourteen or fifteen thousand inhabitants, of which the fourth part are employed in cultivating the vineyards, and another fourth part in carelessly exercising some professions they are ignorant of, and the other half in enjoying the pleasure of a soft, idle, and delicious life. The gout and sickness are banished from these walls. From these hills, that produce such exquisite wines, issue out fountains of ice, and little rivers as clear as melted crystal. These waters issue out from the earth in a line opposite to the perpendicular, bubbling up, and pushing out of the earth on high globes of rock crystal, which keep their spherical figure, till they are at the superficies.

The hills of Upper Burgundy, which produce the wine, the only wine which one can or ought to call Burgundy wine, do not extend farther than from Dijon to Chalon, upon the Saone, yet we ought not to reckon these vineyards to be in perfection but from Chambertin to Chagny, about twenty-four miles in extent, for the Vines at Dijon and Chalons do not enjoy those climates which produce those wines that are fit to be transported into Great-Britain, the circles of the Empire, and the Low Countries, as those which are confined within the limits, that I shall mention as exactly as I can, without being apprehensive of passing under any censure upon this account.

The same row of hills in the same situation, and having the same aspect of the sun, extends itself almost as far as Lyons, and all those little mountains are wholly covered with Vines, but the lands are less fine, and less light at Chalons, heavier at Tornus, and coarser at Maçon. This alters the form of the productions of these little hillocks, which, notwithstanding they have the same arrangement, and the same situation, produce so different liquors.

All those little valleys are linked one to the other to the east aspect of the sun, and form the figure of an unbent bow, and have opposite to them a row of mountains of the like figure, but a great deal higher, which appear or seem to join them, although they may be fifteen, twenty, thirty, and some sixty leagues off, and forming an oval figure, contribute to make the

the finest prospect in the world. This oval must have more than one hundred and fifty leagues in circumference.

From these hills of Beaune all the opposite mountains are seen, and they are those of Switzerland, the Franche Comté, and Mount Jura, of which Cæsar speaks, at this time called Mount St. Claude, those of Savoy; beyond these is a frightful void, and of an immense length, and Mount St. Bernard rises into the clouds, always covered with snow in the most violent heats of the dog days; and although it be sixty-five leagues off from Beaune, it is seen distinctly without the help of any glass.

This perfect oval forms a plain of the same figure, to which these mountains that environ it, seem to serve for walls and ramparts; this vast plain is watered by the Saone, which he calls *Alduadubis* in his Commentaries, which has its source at the foot of Mount Jura, passes by Besançon, and by Dole, and casts itself into the Saone at Verdun; there are also a thousand pretty rivers and streams, which, after many turnings and windings, lose themselves in the Saone.

This great plain, which is at the center of the continent, is so even, that the Saone which runs through it, by its gentle course deceives the eyes of those who look upon it, it being difficult to discover which way its stream glides. Cæsar himself was surprized at it, as he declares in lib. i. of his Commentaries.

The Saone is a river that separates the Eduani and Sequani, i. e. Bourgogne from the Franche Comté, and flows into the Rhone with an incredible gentleness, that one cannot distinguish by the eye which way its waters run.

This is a vast plain, so fertile and even, that all the kings of France are wont to assemble their armies there, when they have a mind to shew the encampment of all their troops to the queens, and the ladies of the court.

Behind the first row of hills that produce so good wines, there is nothing to be found but hills and valleys; the hills that are the least distant are all planted with vineyards, and these situations are called backward hills. In the hottest years, when the rains are less frequent, the Grapes there make a very good wine, but it never has the perfume of the wines produced by the forward hills.

The plain of this oval is in part covered with vines, fertile in all sorts of grain, embellished with vast meadows, where a thousand streams play in their different windings, adorned with fine forests inhabited with stags, wild boars, and above all, with roe bucks, which are there very delicious, and agreeably furnish the gentry with the diversions of hunting.

A great part of these lands are planted with trees in form of orchards, which produce without culture excellent fruit, which, when they have been once grafted, it is enough, the sun and the earth do the rest. The Peach-trees, which throughout sympathize with the Vine, there make upon the banks a fair forest, and the branches of these trees grow thinly, and the leaves being narrow, they do not hinder the sun from darting his rays on the Grapes to ripen them; the Peaches which they produce are of a figure and a colour that would not anticipate one in their favour, nevertheless, when one has tasted of them, it seems to the palate to be a fruit made of wine and sugar.

It ought not to be forgotten, that when the sun is risen above the mountains of Savoy, there is a prospect of the hills of Burgundy, where it shines during the whole day, and in setting behind the hills of Beaune, parts its rays upon the mountains of the Franche Comté, which lie opposite to it, and there in going down, ripens very excellent wines, as those of Arbois, which are so well known throughout Europe for their excellent qualities.

Before I begin to speak of the quality of the wines of Beaune, it will be proper to give an account of the manner in which they there cultivate their vineyards,

and make their wines, for although Burgundy, by the goodness of its soil, and its exposure to the rising sun, does naturally produce delicious Grapes, yet the manner of cultivating their Vines, and of making their wine, contributes much to its goodness.

During the winter the vigneron employ themselves in examining the earth of their vineyards, and by some loads of earth conveniently laid, which they carry thither, they fatten the places which appear to be worn out, and seem to require assistance to produce the better Grapes, which happens however but very seldom. But then they take notice of those places which are void of Vines, whether they are declining by age, or do not appear to promise Grapes, and they make large trenches from a foot and a half to two feet and a half long, and a foot deep. If the earth is too lean, they put in half a foot of good earth, and sometimes a little old well rotted dung, but generally speaking, they put in nothing at all, and taking one or two branches of a neighbouring Vine, they bend them down into each trench, and cover them afterwards entirely with the proper earth of the vineyard, in such manner, that you may see the two ends of the Vine branch bent come out of the earth; to wit, that by which it holds by the Vine, and that of the other end, which comes out of the trench, where they have bent it, about three or four fingers in length. They make a great many of these trenches in a vineyard, that they may be always supplied with young Vines that will produce a good plenty of Grapes, for it ought to be observed that this Vine branch bent down in a semicircle in this trench, which is a shoot of the preceding year, having its pores open, takes in two sorts of nourishment, the one from the Vine to which it is united, and the other from the trench in which it has been bent, in which it takes root. These are what they call provins or layers.

They produce abundance of Grapes, which are commonly first ripe, well nourished, large, and well relished, but their juice is not so good as that of the Grapes of the old Vine. The physical reason is, that the nourishing juice has not been so well filtered in passing through those layers, whose pores are very open, and in passing thro' the pores of the old Vine, whose pores are more close, and less spongy.

They dig with a spade the vineyard ordinarily three times a year, that is about the end of February, or the beginning of March, when they give it the first time, and it is in the month of March, or about the end of February, that they prune their vineyards.

And in this consists the address and skill of the vigneron, for he ought to make a right choice of those fine branches that he is to prune, and of the joint where he is cut the shoot, as well as that which he is to cut entirely off.

Observe what I have seen practised by the vigneron. Of four or five branches, the shoots of a year, belonging to the same stock or Vine, they leave but one or two of the best made, which they cut off to the third or fourth joint at most.

The same they practise on the Vines of the hills, which produce the finest wines, for as to the Vines on the backside, or of the plain, they cut them to the second or to the first knot, for these Vines put forth too many shoots; but, as this is an art of which it will be difficult to give the precepts, because the manner of cutting the Vines is different, according to the ground, the nature of the Vine, its quality, exposition, and nearness to the sun, I will go on with my dissertation.

When the Vine is cut, they place stakes or Vine props, to which, at the height of half a foot above the earth, they bind the branches of the Vines in a horizontal manner, and afterwards, when the buds or eyes are opened, and have put forth shoots in length about a foot and a half, they bind them to the props which sustain the branches and produce the fruit. These props are of the height of three or four feet, and the thickness of two inches; they are stuck into the ground without any arrangement or order, at the distance

distance of a foot more or less one from the other, according as the vineyard is more or less furnished with Vines.

Nevertheless, the end of the shoots which are there bound horizontally, as one may say, look all to the same side.

This manner of placing the props without order is of great consequence, i. e. that one branch may not be covered by the shadow of another but as little time as may be, and that if the rot comes to some Grapes, they may not be able to communicate it to others. This manner is contrary to that of the English, who plant their Vines in rows, and thence it is that the one hinders the sun from shining upon the other, and of consequence, that hinders the ripening of the Grapes.

The most dangerous season for the Vine is when there has been a north wind, which has caused a small white frost. If the sun comes to appear in the morning, it dries and burns all the young leaves, the buds, and the Grapes, after the same manner as if fire had been there.

It is for this reason that the friars in Burgundy have recourse to prayers at this time more than at any other, and that after calm and cold nights, the superstitious peasants run to the churches, and ring the bells with all their might. Whether it be that they imagine that God has any regard to this work of religion, or that the agitation that they make in the air may, in some sort, warm the air again, or change the wind, but however it be, they do at this time ring the bells with such violence, that there is no sleeping; during which times the priests and monks are busy in reading in the churches the passion of our Saviour, according to the gospel of St. John, and for this occupation they make a collection among all the presses at the time when they make their wine, and every vigneron is obliged to give them a certain quantity of wine, and that by an order of parliament at Dijon.

When the vineyard has escaped the danger of the frost, they dig it again, and this they call *biner*, or the digging of the vineyard the second time; after which the Grapes soon begin to flower, which spread a sweet favour all over the country, and is the time when all the wines which are in the tuns in the vaults, though never so deep, if they are upon their lee, without having been drawn off or clarified, work, ferment, grow thick, and cover their superficies with small white flowers like snow; a thing difficult to be explained by philosophers, in this question in physics, when they demand, *Utrum detur actio in distans?*

It must be observed that all the Vines of the good hills of Burgundy pass from their flowers to the Grape, that is to say, that the flower of the Grapes changes into berries in the space of twenty-four hours; and if, during that time, there happens a cold fog, or a cold rain, their flowers, instead of turning to Grapes, fall, and the second peril is no less dangerous than the first, when that happens. The term that they make use of to express it, is to say the Vines are *coulées*, i. e. drop their Grapes.

At the end of June, or the beginning of July, is the time when the Vine changes from the flower to berries, after which the Vine has nothing to fear but the hail, or a too great drought. As soon as ever the vignerons see the least cloud to rise upon the horizon, and the air seems to threaten the least storm, they have recourse to their priests, their bells, and their pater nosters, which they would not recite, but for fear that the people would rise against them, if hail should happen during that time that they were not at their prayers.

The reason that they are so much afraid of the hail in Burgundy is, because the vintage is all the dependence of the inhabitants, and that the Grapes being smitten by this scourge, give to the wine, in some measure, the same taste, and the same scent, which lightning spreads on the places where it falls, a scent which is impossible to take away.

As to drought it is not only to the bells, or to the priests that they have recourse, but to one or two stone busts in two villages about seven or eight miles from the town of Beaune, one of which idols is known and worshipped under the name of St. Reve-reen, and the other under the name of St. Marguerite; they assemble together, and go in procession to search in triumph for this stone, which they carry solemnly to a church in the town. All the priests go in procession, followed by the parishioners of which they are curées, and they offer their incense and prayers, rub their books and their charlets against these extraordinary figures, and oftentimes it happens to rain in this conjuncture, which does not a little contribute to keep up this superstition of the people.

It is in July that they dig the vineyard the third time; this they call *thirdling*. There are many years in which they dig their vineyards the fourth time, and this is in the month of August that they give it this fourth digging, but they take great care to dig the fourth time when the season is not too hot and dry, or on the contrary, to defend the Grapes from the heat of the sun, they let the Grass grow in the vineyards; this shades them, and hinders the vapours of the earth from burning the Grape.

A month before the vintage, the magistrates of Beaune, accompanied with many experienced judges, and persons of probity, make three visits to examine the maturity of the Grapes, and at this third visit and examination they decide the day of gathering the vintage. No private person dares to cut in his own vineyard one single basket of Grapes, upon pain of confiscation, and a considerable fine; for, if it were permitted to each particular person to gather his vintage according to his own fancy, and his particular opinion, and according to his taste, there would be wines too green sent abroad into other countries, to the dishonour of Burgundy, and to the discredit of the wines.

And also for fear that any vapour should spread itself over the vineyards, for fifteen days before the vintage, they take care not to burn any straw or Hemp stalks in the streets, lest the smoke should give any bad taste to the Grapes.

The Grapes being come to maturity, the magistrates give notice a few days before by a trumpet to the town, of the time they have appointed and fixed for gathering the vintage. Volnet begins first, a day before Pomard, and afterwards all the little hills gather their vintage indifferently; for after the town of Beaune has gathered their vintage one single day, the vintage is opened for all the other vineyards on the side of Burgundy. It will be seen by and by why Beaune decides the vintage of Volnet and Pomard. It will scarce be believed that all the hills from Chamberry to Chagny should have their vintage gathered in the space of four or five days, and also it is scarce credible, what a vast number of mountaineers from every part come to labour in this work.

They gather the vintage perhaps (and my conjecture is founded upon more than twenty-five vintages which I have seen made) more than two thousand (queues) tuns of wine upon these hills, and the queue, which is always divided into two puncheons, sometimes into four fuellettes, and very rarely into eight cabilons, contains five hundred bottles of wine, or, to speak more exactly, four hundred and forty pints Paris measure.

It will be proper here to observe, that in this great extent the vineyards produce but one kind of Grapes, which they call *Noirons*; the berries of which are black when they are ripe, and quite round. The plain and the backfides produce only a sort of Grape, of which the berries are bigger and a little longer, which they call *Gamet*.

Those who would make excellent wines, never cut the Grapes till after the sun has dried up the dew which has fallen in the night time; for this moistness, although it be but a rarefied air, cools the Grapes, which, being cast into the first vat, suspends, and

oftentimes hinders the fermentation. Those covetous persons who are more desirous of the quantity than the quality, use not these precautions; but on the other hand, those who would make excellent wines, do not put into the same vat any Grapes but those of the same Vine; but almost all the particular persons who have a hundred perches of vineyard in different cantons, mingle their Grapes the one with the other, because the strong helps the weak, and the good mends that which is worse, and in a word, that they may make the vat the larger. The choice of the cantons from whence the wine is produced, depends on the discernment that the commissioners ought to have, when they taste the wines they would send into other countries, and that which the English gentlemen ought to recommend to their commissioners who furnish them with wine for their drinking.

The Grapes, being put into the fermenting vat, throw up a great scum, which by the agitation, make to the ears a continual trembling, a little clattering, and spread abroad such a scent, that is capable of intoxicating, and perfumes the houses, and spreads itself all over the town.

They do not let the Grapes lie still in the vat, they stir them and disturb them. The labourers trample them briskly three different times, for the space of two hours each time. And to give a clear idea of the manner of treating the Grapes in the vat, as soon as they begin to ferment in the vat, they tread them for two hours at the least; six hours after they tread them again for as long time as before; and six hours after that they tread them the third time; and after that they put them into the press.

It must be observed, that the Grapes of Volnet, of Pomard, and Beaune, being fermented in the vat in the field, cannot be let stand above twelve or eighteen hours there; those of Pomard a little less; those of Beaune so long, or a little longer, according to the delicateness of the ground, and the heat of the Grapes; for there are vineyards behind the hills of Beaune, the Grapes of which do not begin to ferment till after they have been eight or ten days in the vat. Note farther, That to give a colour to the wine, depends on the time more or less that it is left in the vat. As for example; the wines of Volnet have the colour of a partridge's eye. This is the cause they do not leave the Grapes of this ground but a very little time in the vat; and if they should let them be there but a little longer than they ought, the wine would lose its delicacy, and would taste of the Grape stones or the stalks.

After the Grapes have been, according to their quality, more or less time in the vat, and have been trodden, there swims over a liquor they call *furmou*. They have casks of sixscore pots, or half hogshheads of sixty pots, ranged upon chantiers, or stillings for hogshheads, into which, by equal portions, they cast in this first running; and afterwards they put the Grapes that remain on the press, when the *furmou* has been drawn off; and when these have been well pressed, all the liquor that comes from them is equally distributed into those pieces where they have already put the unpressed wine: and then they open the press, and afterward with a planer, they cut the pressed mark three or four fingers thickness round about, and put the parings in the middle, and afterward press it again; then they cut it again, and press it a third time; and all the liquors of these different pressings are equally distributed into the tuns till they are full.

Upon which it ought to be observed, that the unpressed wine is the most light, delicate, and least coloured liquor; that which comes off the first cut of the press the most racy, and that which comes from the second and third cut of the press, is more hard, red, and green, so that these three sorts of qualities being united, make a wine much better, more durable, and finer coloured.

All these pieces or tuns being full, they leave the bung open, and the wine, in a fury, shakes and agi-

tates itself in such a manner, that it sends all over the cellar, fumes that will intoxicate; and which are in such motion, that a lighted candle being carried thither will be extinguished: and if this wine be put in an essay and shaken a little with the hand, and you stop the neck with your thumb, the essay will break in a thousand pieces.

In Burgundy, that which they call an essay, is a little round bottle, in length about three or four inches, and about two in circumference, which grows less all of a sudden at the top, in order to form a little neck open, having a little rim to receive the wine and the cork.

The wine having cast its fire and scum out of the casks, eight days after they fill them up again, and stop them up with a Vine leaf, which they spread over the bung; and lest the vapours of the wine should move this leaf out of its place, they lay a little stone upon it to keep it down; because if they should put upon it a seal, or a bung, the wine not having air, would push the heads of the casks out. Five or six days after they seal it, and near the bung they bore a hole, and stop the hole which the gimlet has made in the tun with a little bit of round-pointed wood, which they call a *faucet*, which they take out from time to time to let the spirits evaporate; which precaution prevents the wine from bursting the vessel.

This is the time when at Beaune are to be seen the merchants from all the corners of Europe, who come to secure the best vats for their kings, princes, and masters.

The commissioners and their wine conners prove the wines, although they are not yet drinkable. The commissioners are the public managers, to which all those who would have the wines from Burgundy, address themselves either by letters, or in person. These are the judges, which, time out of mind, from father to son, have certain experience of all the vats, who know the climates, closes, and the cantons, from which they are produced, and all the good cellars; to whom it is sufficient to write for what quantity of wine one would have, and of what district or canton one would have it; and, provided they have the purchase money paid in the space of the current year, one may be sure to be well served.

These managers, having received all the commissions from private persons, go to the citizens, and fill their essays of the different vats which they find in good cellars; and with the tickets that they tie to the neck of every little bottle, or the name of the vat, with the quantity of the pieces of wine which they contain, they carry them to their houses, and let them be unstopped. They examine and attend them carefully, and by the different changes, taste, and colour, they see the future colours and qualities of the wine, that are in the tuns from which the essays are taken. They also make yet another proof with the wine which is in the essays; they take glasses, upon which they put a sinking paper, which they spread, and which juts out over the glasses, and press their finger to make a concavity, which may contain a fourth part of a glass of wine. The liquor passes by little and little, and filters through the paper, and drains drop by drop in an imperceptible manner into the glass which receives it. By the sight of the wine which passes thro' this paper, they make good conjectures, founded upon long experience, concerning the destined taste, of the colour, and of the lastingness of the colour, of the wines they have proved.

The commissioners having made their purchases according to the order which they have received from their correspondents and merchants, they make preparations to send them according to their orders; and as to the price of the purchase, they cannot deceive any person without running great risques, for if they should make those who send for these wines pay more for them than they can buy them for in the cellar, they would expose themselves to hanging by an *arret* of the parliament of Burgundy, who have made a law for the ascertaining the fidelity of the commerce of

of those wines; which orders, that the commissioners shall take one sol per livre for as much as comes to sixty livres; and for what exceeds this sum, they shall not take more than six deniers per livre. Thus a private person who shall receive for six hundred livres of wine French money, shall pay three livres to the commissioner for what he shall have sent above sixty livres; and for the five hundred and forty which are over and above, for which he is to pay the commissioner, he shall not demand more than six deniers per livre, which will be the sum of twelve livres six sous; which being added to the three livres above, make the sum of fifteen livres ten sous; a sum which would amount to twelve or thirteen shillings, according to the exchange; and for this small profit, the commissioner is obliged to advance his money to the citizens of whom he buys the wines; and that too, when he does not receive his payment from the persons to whom they are sent, as it sometimes happens. And the commissioner that shall be convicted of taking more, whether by books or other proofs, will be punished as has been said above.

The commissioners having purchased and proved their wines according to the orders they have received, they cause the tuns be new hooped, and put bars surrounded with pins of wood of the Aspen-tree, and mark them with the town mark. And it ought to be observed, that no other country has a right to imitate or counterfeit their second hooping; and for the greater surety, they put upon each cask the fire mark, which is a B on the top, two inches in length, with the cypher of the year in which the casks were sent from Beaune to go to any other place.

These are the precautions that are taken in Beaune, by which the wines that come from thence cannot be mistaken; a caution otherwise not very necessary, since they manifest themselves so plainly by their delicacy and superiority above all the wines in the universe. They are besides very beneficial and proper to establish and preserve health; in this surpassing the wines of Champaign, which flatten the taste, and grate the palate; but which weaken and enervate, enervate, and render dull, as one may say, the most healthful bodies; and which also, according to sad experience, and the writing of the learned, which I have read, breed the gravel, the gout, and the stone.

After having given an account of the situation of the town of Beaune, and the hills which produce the wines of Burgundy; after having related the manner of cultivating their vineyards, and of making their wine, of proving, chusing, and buying it, I shall next explain the different qualities of the wines which these divers hills produce; and in order to this, I shall divide what follows into three small articles, by treating first of the forward wines; secondly of the wines de garde, or for keeping; and thirdly, of white wines; and conclude in giving instructions for the different methods that are to be used in bringing the wines of Burgundy to London, and advise how the Beaune wine may be sent to London in bottles.

The first article of the wines of primeur, or the forward wines.

They call that wine of primeur, which will not keep good more than one year, or that can be kept but a few months of the second year.

The first wine of primeur grows at Volnet, which is a village situated about three miles from Beaune, upon a descent of a mile in height at least, and two miles in length on the side which is exposed to the rising sun. This village, as well as Pomard, have their dependence on the city of Beaune. Since the citizens have been their lords, as I have said before, these two plots of vineyards have been obliged to receive the law of their vintages from the magistrates and sages named for this purpose.

This hill produces the finest, most lively, and most delicate wine in Burgundy. The bunches of Grapes

of the vineyards of Volnet are very small, as well as the berries. The branches rise scarce above three feet high, through the whole year. The Grapes of it are so delicate, that they will not bear the vat more than twelve, sixteen, or eighteen hours; for if they be suffered to stand longer, they would take the taste of the stalk.

This wine is in colour a little deeper than the eye of a partridge; it is full of fire, strong, and light; it is almost all spirit, and is in short, the most excellent of all Burgundy; which by reason of its violence, is not traded in, but its intoxicating quality is soon dissipated. The duration of the wine is from one vintage to another, though it perishes at the beginning of the dog days, after which it changes its colour, and is turned, but yet I doubt not but that it would keep longer in very cold vaults. The finest of their vats is drawn from a canton of vineyards that is called Champan.

Pomard is the second plot of vineyards of the primeur; it is situated between Volnet and Beaune, not quite so high as the first, and a little higher than Beaune. It produces a wine that has a little more body than the preceding, is of the colour of fire, and has a great deal of perfume and balsam; it will hold good some months longer than that of Volnet; it is more merchantable, and better for health; if it be kept above a year, it fattens, ropes, wastes, and becomes of the colour of the skin of an Onion. The best vat is that of Commeraine, which will sometimes keep eighteen months, but that is according as the year is.

The city of Beaune contains one very considerable plot of vineyards; it contains only four hills, which are about four miles in length from Pomard to Savigny. The first of these is called St. Desire, the second the Montée Rouge, the third Les Greves, and the fourth the Fountain of Marconney. These different soils produce wines which participate of those of Volnet and Pomard, without the faults of them; they have a little more colour, many good qualities, and lastingness.

The wines of Beaune last some more, and some less, but they do not last above two years; they are sweeter, more agreeable, and more merchantable, than the two preceding, and much better for health. The colour of these wines is not equal, because that depends much upon the manner of making them; or that they let it remain more or less hours in the vat, according as the climate is more or less delicate where it is made. There are in these four hills, certain inclosed cantons, which are in great reputation. The Feves, Cras, Greves, as also the king's inclosures, are very delicious.

Aloffe is the fourth vineyard in the primeur; it is situated upon the declivity of a hill about three miles from Beaune. This valley is an ascent so gentle, that one can scarce perceive that one ascends, till one has come to the top of it. This little village produces wines of an extreme delicacy; they are less brisk than the former, but of a taste more flattering. The colour is a little more soft, and less sparkling, but fine; and like the hill that produces it, the wine is too little elevated, and too much declining; it partakes neither of the firmness, nor stiffness, of the wines of the height of the hills; it has all the tenderness, none of the hardness, and of consequence is subject, in a little while, to grow ropy, and to take the bad quality of sweetness; nevertheless, it is sent to foreign countries; but it requires much choice and judgment.

Pernand, which is between the last vineyard and the grand vineyard of Savigny, is of a greater extent, but is of small account, the wines not being very delicate. They are of the quality of the preceding vineyards, but harder and firmer, because they are produced upon a hill that is higher and steeper. There are some vats very delicious, and these go into other countries, but under the name of Beaune wine.

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Chassagne is not very considerable for its extent, but is of great reputation for its wines. This, in my opinion, would be more fit for England, because it would better bear carriage by land and sea. It is extremely strong, full of fire, and heady. It is commonly tart, which renders it more durable than the others; but if persons have skill and leisure to bottle it in the proper time, and to drink it when its tartness begins to fall, it is one of the noblest wines in the world. If I had the office of providing the king's wine, I would go into Burgundy to chuse it; and in chusing the wine of this climate, I should be likely to succeed. This is the only wine that one may leave in bottles without fear of its growing ropy, changing its colour, growing eager, or turning. The longer you keep it, the better it is.

It is more balmy and nourishing, but nevertheless you may not prescribe above three years for the bounds of its duration. It will be fit for drinking at the end of the second year; sometimes it lasts four years, when the vintage has been very good.

This is the rank of wines in the primeur, though its duration is a great deal longer.

Savigny is a great extent of ground between Beaune and Pernand, situated in a valley formed by the separation of the two mountains. As the hills that compose this vineyard are open to the rising sun by a great space, and as they are shut up as they approach to the setting side, they participate of the rays of the sun obliquely, and on the other directly. This soil produces excellent strong racy wines, which have both body and delicacy, when they have been drawn out into bottles; but they must be visited now and then, so as not to let slip the time when they should be drank. This would be a very good wine for England; it will keep as well, and better than Chassagne; it is not so delicate, nor so brisk, but it is more oily and very good for health.

Auxey is pretty near of the same situation, in a corner between two hills, which open themselves to Muffault, or as far as St. Romaines, where may be seen high mountains crowned with very high rocks. This vineyard produces wines more red and strong than those of Savigny, but they have not the reputation of them. These wines have more body than the preceding, and ought to be the drink of all those gentlemen that would not shorten their days by drinking those heady sparkling wines, an excess in which is so dangerous.

The second article, of the wines de garde, or those which will keep a great while.

Nuis is a very small village, about nine miles from Beaune, in the road to Dijon. The territory of this village contains between four and five miles in extent. All those gentlemen that love the most delicate and healthful drinks, have the wines of the hills of Nuis for their tables. These wines are at first very rough, sharp, and tart; they require to be kept till the second, third, fourth, and fifth year; and when their roughness and hardness are gone, their tartness being fallen, there comes in their place a perfume and balminess very delicious; they are of a deep velvet colour, and yet neat and brilliant. Lewis XIV. drank no other wine.

The close of Vogeot is situated a league from Nuis on the side of Dijon; it appertains entirely to the monks of the famous abbey of Cîteaux, built between the Saone and this hill. The wine which it produces, comes nearer to that of Chassagne than to any other; it is very excellent, and is drank in foreign countries.

Chambertin produces the most valuable wine of all Burgundy; it is situated between Dijon and Nuis, and contains the qualities of all the other wines without their faults. This is what one may forget without fear, I have drank it six years after it has been produced, and it poured troubled and thick into the glass, but grew clear immediately, and by its motion

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recovered its spirits, and a colour the most lively and neat; and they also sell it as dear again as the other wines of Burgundy. It was sold the last vintage for forty and forty-two pounds sterling the chantier; when the wines of Volnet, Pomard, and Beaune, sold for not above twenty pounds sterling a queue, which contains, as I have said before, four hundred and eighty Paris pints.

The third article, of white wines.

Before I begin to treat of white wine, it is proper to let you know, that it is made from a masculine kind of Grape. This has two qualities, that the Grapes of the other colour have not. The first is this: That if the vintage be late, and the white frosts and great cold come, it resists the hoar frost; while the black Grapes grow sour, withered, and shrivel immediately.

The second is, That as soon as these white Grapes are cut, they must be put into the press without entering the vat, and without being trod as the black Grapes are; for if they were put there, they would give only a livid, ruddy, yellowish liquor. I thought myself obliged to acquaint the public with that.

Muffault is, after Beaune and Nuis, the largest vineyard of Burgundy in extent; its wines are generally approved in Germany, the Low Countries, and throughout all France. The wines which this soil produces in all hot and dry years, are delicious, sparkling, agreeable, warm, and beneficial; they are not dear, and if they were well chosen, they would be a pleasure to those that drank them. When they are kept above a year and a half, they sometimes grow yellow and eager.

Puligny is a vineyard next to Muffault, but much more in the plains, which produces the best white wines. They are, within a very little, of the same quality with the wines of Muffault, but their fame is not divulged, and the name is almost unknown.

Aloffe, in which I have spoken in the article of the first wines, produces also excellent wines.

Morachet is a little plot of ground between Chassagne and Puligny in the plain, which is in the possession of one vein of earth, which renders its soil wholly of the same kind. It produces a white wine the most curious and most delicious in France, and there is no wine of Cote Rotie, Muscat, nor Frontignan, that equals it; it produces but a very small quantity, and it sells very dear; and, in order to have a small quantity of it, it ought to be bespoke a year before, because this wine is always bespoke before it is made; but great caution is to be taken not to be deceived, for the neighbouring vineyards of this close partake a little of the quality, and oftentimes pass for Morachet, and therefore it will be absolutely necessary to have a faithful correspondent. This wine has those qualities that neither the Latin nor French tongue can express. I have drank of it six or seven years old, and am not able to express its delicacy and excellence.

I am now going to treat concerning all the vineyards of the Upper Burgundy. Those who have passed the grand road that leads from Dijon to Lyons, the length of the hills, will do justice to my exactness, and I desire those that have not been there, to believe that this relation is agreeable to truth.

I have a hundred times heard boasting of the wines of many hills near Auxerre, to which they give the name of the wine of Burgundy. It is true those hills are in Burgundy, but they are ninety miles distant from the true hills, of which I spoke just now, which only produce these wines of Burgundy which are in reputation, and which they drink after two manners, by the nose, and by the mouth, either both at once, or separately; both at once in that when one drinks them, the pleasure which he has in the smell, vies with the relish it has on the palate; and separately, so that a person that has been used to drink it, may know whether it be the true Burgundy or not, by the smell,

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or sweet odour. The good tasters taste it by their nose, before they put it to their mouths; and all the other climates of Burgundy, as those of Chablis and Auxerre, have no such quality as the true wines of Burgundy have, although they are really made and produced there.

It remains for me to relate how these wines may be brought to England. It has always been the custom to bring those wines from Burgundy in their casks; but as the carriage is long, and there is oftentimes a risque run, so the carriers as well by land as by sea, are not always faithful; for notwithstanding all the precaution that can be taken to hinder them from drinking the wine, they will always find out stratagems to do it. If it be packed up in casks with straw and linen cloths, this is but a feeble obstacle to their industry. And for all this precaution, if the cask happens to leak by the way, this will be at the peril and loss of the purchaser. If these wines be put into double casks, this precaution will have no better success than the foregoing, and is exposed to the same risque; and the casks of the best vintages are a great prejudice to the delicate wines, because this gives the full scope to the spirits to evaporate, and of consequence they will cause a great diminution of the quality of the wine.

It ought to be brought in bottles from Beaune to London: for this purpose, some agent who buys the wines by order of the person, should be addressed to, to draw it out into bottles, and to send it in cases to England. These cases being filled, need not be carried by land above ninety miles to Auxerre, where they may be embarked on the river Yone, which passes into the river Seine, and from thence to Paris, and afterwards to Rouen, where are vessels which pass very often to London.

The agents of Beaune would also be very well pleased to bottle the wine that they were ordered to buy, provided their correspondents would give orders for enough to make a carriage. As for example; if two or three persons would join to give orders for a thousand bottles; this would be a complete carriage; and as those of Volnet draw their wines into bottles at the end of December, a person that would have five hundred bottles of Chassagne or Nuis, ought to join with another that would have the like quantity. The agent might bottle up these wines a year after the vintage, either more or less, and the purchasers might receive the wines of Burgundy exquisite and delicious; and in like manner, all other wines that they have a mind to have. As to the price of the wines of Beaune, Volnet, Pomard, Chassagne, and Nuis, it is pretty near equal, or at most the difference is not very great. A queue of Volnet wine contains four hundred eighty Paris pints, which will make five hundred bottles, and will cost in the country, some years ten, twelve, fourteen, or eighteen, and at most twenty pounds sterling. The carriage may cost to Calais twelve or thirteen livres, and afterward from Calais to London a very small matter; so that taking the years one with another, the dearest wines of Burgundy, except that of Chambertin, which is the dearest, would scarce, in London, stand in fourteen or fifteen sols a bottle, the customs not being reckoned in.

The method of making wine in Provence.

The delicateness of the taste of Grapes is not always a certain proof of their goodness for making wine; it is not always with these Grapes, so agreeable to the taste, that the best wines are made: we should not be surprised, that our wines are not the most exquisite, since we do not observe any rule in the choice of the Grapes, which ought to be done.

It is certain, that the juice of Grapes of different kinds, cannot but produce a confused mixture, which suffers divers alterations in the casks, by the different fermentations, which the sulphureous particles of the Grapes excite there; by which they suffer themselves

to be very easily opened at the approach of heat. This is what happens to wines which have been made of a mixture of many kinds of wild Grapes. Experience informs us, that wine drawn from such Grapes is very subject to ferment and grow foul, as soon as the heats of the spring begin to approach; which does not happen in the winter, when the coldness of the air holds it, as it were, bound and embarrassed by the sulphureous particles of the wine. It is the same thing in the juice of the Grapes called Clarets, Plans, Estrans, Pignalets, &c. when they are mingled in too great a quantity with the others. The common fault of our wine is, that they cannot be kept the year throughout; they are apt to grow foul, or turn, as it is called, upon the least transport.

The greatest part of our citizens believe it to be the fault of the soil, principally the vineyards planted in the places where the bottom of the soil is plaster or transparent stone, which is the case of all that extent of ground, which begins from R. P. Capucins, as far as Aguilles, which they commonly call Pay-blanc, i. e. white country. But how many vineyards have we planted in different soils, that are subject to the same vice? It is generally agreed, that the soil which they call gris [gray,] is the best for vineyards; nevertheless it is found, that the quarter of Molières, of Repentance de Barret, and of Montaguez, are not exempt from this vice. I am of opinion, that it proceeds from the mixture of too great a quantity of different sorts of Grapes; I cannot deny, after experience, but the nature of the soil, the culture, and the dung they use, contributes very much to this vice, which is what I shall hereafter examine into.

Therefore it is necessary to know, what Grapes are fit to make good wine, that may be in a condition to be kept without being foul or turning, and how to make it.

It is very true, that a person cannot make from one vineyard a great quantity of wine, that shall be at the same time good in quality. A vineyard ought to be planted on those high grounds or hills, which are exposed either to the south or south west.

And the soil ought to be a sort of brown, or approaching to it. Those which we call Arpielo, Malaufene, and Saveon, are soils which are scarce proper to nourish stocks that will produce Grapes for making good wine. The vineyards which are round about the Peres Augustins Reformez, commonly called Saint Pierre, are planted in a soil of Saveon aforesaid, very unfit for producing Grapes of a delicate relish, or for making good wine.

The entrance into the territory of Tholonet is, for the most part, a soil which our country people call Malaufene; and also the wines that they produce are none of the best.

Those Grapes ought to be chosen, which grow upon stocks that are planted in a soil somewhat rocky.

As to the culture it is certain, that good wine cannot be drawn from Grapes that have too much nourishment, and of which the sap has not attained the least degree of concoction or ripeness.

Those which we call Ollieros, which are commonly dunged, and which they cultivate with pains, give a great quantity of Grapes; but their great nourishment is an obstacle to their making good wine. Those which we call open vineyards, are to be preferred to them.

We ought to prefer the Grapes of old vineyards to those of young ones. The proper vineyards for making good wine, are those which have been planted twenty-five or thirty years; the older they are, the more proper they are for making good wine; and till the vineyard has been made seven or eight years, good wine ought not to be expected from it.

As to the choice of Grapes, we ought to mix some of the best sorts that we have. These kinds are, of the white Grapes, the Aragnan, Roudeillat, Pafeau Blanc, Estrani, Yni, and Aubré. Of the black, the Catalan, Bouteillan, Uni Nègré. The must that is drawn from these Grapes ought to ferment in the vat

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at least three weeks, when the husks must be separated from the must.

It ought to be noted, that the proportion which should be kept between the quantity of these kinds is different, according to the design which every one has of keeping these wines.

The black Grapes, and above all the Catalan, and the Boutellan, should make more than half the quantity of all the rest.

Those that desire to have a wine of a deeper red, should take a greater quantity of black Grapes, and ought to let them stand a longer time in the vat, if they have occasion to change the wine from time to time.

They make white wine of the Grapes they call Aubier, Uni, Roudeillat, Aragnan, Pignolet. If they would have wine proper to keep in the heat of summer, they ought to use none but Uni, Aubier, and Aragnan.

Nobody is ignorant, that we have wines made of but one species of Grapes; as that of Muscat wine, and claret: for the first they make use of Muscats, as well white as red; for the second, of the Grapes they call Clareto.

They keep these Grapes with us, during the whole winter, and some part of the spring, hanging upon a beam in a room. All sorts of Grapes are not fit for keeping; those kinds that are called Pendoulans, or Rin de panse, le Land de Pouërre, le Verdau, are the best for this purpose; the Aragnan and Estrani are so likewise; also the Clareto, Muscat, and red Uni; the Barbaroux, and the Espaguin, the Taulier, and the Roudeillat, will not keep so long. They ought to be gathered full ripe, and before the rains, and none to be chosen but those that grow upon old stocks.

They also preserve those Grapes to make what the Latins call *Uvæ Passæ*; not because dried in the sun, but because they are exposed to the sun hanging; they call them in French dried Grapes; the provincials call them Panfes. They make use of none but Grapes called Rin de Panse or Pendulem, or of Rin Panse Muscat, to make the best Panse. They also make use of the Grapes which are called Aragnans, which is the most common Panse in the hottest places.

They also make use of the Grapes called Roudeillats, and the Plan Estrani. The Grape which we call the Land de Pouërre, is not made use of with us for this purpose, although I have been informed, that they are used in hot countries near the sea coasts. They make their Panfes with us, after the following manner; they tie the Grapes in a string, and put them upon another string at both ends; then they plunge them into a boiling lye, in which they mingle a little oil, until the Grapes shrivel, and afterwards expose them to the sun for six or seven days; and then they lay them in rows in cases, pressing them gently.

Wine is different in virtue and delicacy of taste. The difference proceeds, for the most part, from the different natures of the Grapes with which it is made, the different degree of their maturity, and the diversity of the soil where the vineyards are planted; and also the different culture of the vineyards, and the preparation of the wine; to which may be added, the difference of the climates, according to the greater or lesser degree of heat.

The Romans, as we learn from Pliny, were very curious in searching after the most excellent wines: all their differences consisted in the places where they were made; as the Setinum, Cæcubum, Falernum, Gauranum, Faustianum, Albanum, Surrentinum, and Massicum, which were the most delicate wines of Italy in the time of Pliny. Among the wines of Greece, they esteemed the Maronean, Thasian, Cretan, Coan, Chian, Lesbian, Icarian, Sinyrean, &c. Their luxurious taste carried them in search of the wines of Asia, as that of Mount Libanus, and others, as may be seen in Pliny.

It is to be noted, that the Romans had their most ex-

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cellent wines from Campania, which is now called Terre de Labour, a province of the kingdom of Naples. Those of the other parts of Italy did not come near these last in point of excellency. The Falernian, Gauranian, and Massic, were made from vineyards planted on the hill round about Mondragon, at the foot of which passes the river Garigliano, antiently called the Iris. The Cæcuban, which differs nothing from the Falernian but in age; (this is that which the Latins call the length of time which the wines are able to preserve their strength,) was produced in the Terre de Labour, as the Fundanum and Amyclum were near Gaeta, the Sueffanum of Sueffa Pometia, a maritime territory of the kingdom of Naples; the Colenum about the town of the Terre de Labour; and also many others, with which that province furnishes the city of Rome.

These wines, which are very excellent in their nature, acquired rather by age than by art, a degree of perfection to which none of the other common wines of Italy can attain.

The last, which the Greeks call Oligophora, and the Latins Tenuia and Paucifera, are very easily preserved by the cold, or rather by a fresh air, and grow eager by heat. Also those which the Greeks call Polyphora, Multifera, and Vinosa, become more vigorous and spirituous by the heat.

The Grapes of which the first are made, abound in crude phlegm; the sulphureous parts of the must are more dilated. The last, on the contrary, are drawn from Grapes that are more ripe; of which the must or the sulphureous parts which compose it, are concentrated, and fixed by the evaporation of the humid parts which dilate it. To this may be added, the abundance of the sulphur of these last, which is the cause of the true strength of these wines; and it is by being opened that they acquire this spirituousness. It was only to procure this opening, that the ancients invented the preparing these wines in the manner I am going to express.

Pliny informs us, that in the year 633, from the foundation of Rome, they lodged their tuns full of wine in places covered, which were exposed to the north, such as we now call cellars.

On the contrary, those casks which were filled with vigorous and spirituous wine, such as Polyphorum, were set in an open place, and exposed to the rain and sun, and all the injuries of the weather. Those which contained wines of less strength, were kept under cover. Those which were full of a weak wine, were put into a hollow place and covered with earth.

Galen, in his book de Antidot. chap. 111. and in the Treatise of Vines, that is ascribed to him, remarks very much to the purpose, That the wines of the first order, or Polyphora, were preserved two or three years in these cold places; but if they let them lie there too long, they grew eager, if they did not remove them to warmer places, as they used to practise in Asia, before the Romans had any knowledge of it; and it was by this means that the people of Asia, as well as the Romans and Greeks, attained to the art of making wine keep so long.

The most ancient epocha of the preparation of these wines among the Romans (as Pliny says) was about the year of Rome 633. This author who lived a long time after in Vespasian's time, assures us, that these wines had been kept for the space of a hundred years, and that they grew thick to the consistence of honey, so that they could not be drank without mixing them with water.

He also adds, *Quo generosius est vinum, eo majus vetustate crassescit*, i. e. by how much more generous the wine is, by so much the more it grows thick by age. The same that is seen in our days in the Spanish wines.

This thickness of the wines, of which I am speaking, is less extraordinary than that of the wines of Asia, of which Galen speaks in his book of Respiration; which being inclosed in large flasks, and suspended near the fire of their chimnies, acquire by the evaporation

ration of the humidity, the hardness of salt. What Aristotle says of the wines of Arcadia, exposed to the fire and the smoke, is yet more surprising; Ita exsiccat in utribus, ut derafum bibatur; i. e. so dried in the bottles, that it is scraped off to be drunk. It was so solid, that they were forced to scrape the flasks to drink it, and could not drink it without diluting it with water.

The Romans prepared their wines after the following manner: they took the must that had run from the Grapes that had been trod; they put them into a wooden vat, of which the staves had been bound together by hoops, or flexible bands.

After the wine had been fermented all the time necessary for separating the grossest impurities, they drew it out of the vat to put it into the casks, where it continued to ferment; and to assist the depuration, they mingled as much plaster, or chalk, or clay, or powder of marble, or of pitch, or of salt, or of resin, or of lee of new wine, or of sea water, or of myrrh, or of aromatic herbs, as they judged necessary, every country having its particular mixture. And this is what the Latins call Conditura Vinorum.

They left the wine in the casks until the spring following; also many left them until the second or third year, according to the nature of the wine, and the country; afterwards they drew it out to put it into earthen vessels, which they did over on the inside with melted pitch, and marked on the outside the name of the place from whence the wine was made, and that of the Roman consuls, in whose consulate it was made. The Latins called this changing of the wine from casks to earthen vessels, Diffusio Vinorum, or Vina defundere.

They had two different sorts of vessels; the one the amphora, and the other the cadus. Pancirollus and others say, the amphora was of a square or cubic figure. As to the contents authors are not agreed, but most suppose they held about eighty pounds of liquor. This vessel was contracted at the neck. After it was filled with wine, they stopped the mouth close with cork. The cade was of the figure of a Pine Apple, which is supposed to contain half as much more as the amphora. These vessels being stopped, were carried into a room exposed to the south, situated in the highest story of the country-house where the wine had been prepared. This place was called apotheca.

It was to dissipate the superfluous humidity of the wine, that they exposed these vessels to the heat of the sun, and of that of the fire, and of the smoke, which has given to this place the name of Fumarium, because of the smoke which was gathered by the funnel, through which the smoke of the fire was carried off, when it was lighted below.

These wines could be kept for two hundred years, and would, as has been said, arrive at the consistence of honey, during which, Adhuc Vina ducentis fere annis jam in speciem redacta mellis asperi; etenim hæc natura vini in vetustate est, says Pliny, lib. xiv. cap. 4. So that it is troublesome to drink this wine because of its thickness, and in order to render it drinkable, they diluted it with warm water to give it a fluidity, and afterwards they passed it through a strainer, and this they called Saccatio Vinorum, as Martial says,

Turbida folicito transmittere cæcuba sacco.

It is true, they had other wines of the same nature, which they did not pass through a strainer, as the Massicum, which they only exposed during a night to the air, to procure a fluidity and depuration, as Horace says, lib. ii. sat. 4.

Massica si cælo supponas vina sereno,
Nocturna, si quid crassi est, tenuabitur aura,
Et decedet odor nervis inimicus: at illa
Integrum perdunt lino vitiata saporem.

This lukewarm wine had been very disagreeable to drink, if they had not cooled it with ice or snow, whether in mingling it with the wine, or setting the bottles in ice. The most luxurious mingled snow with the wine, and passed it through a silver strainer, which Paulus, the jurisconsult, calls Colum Vinorum.

Of the method of planting vineyards in Orleans.

Of the distance that should be given to the rows, and the breadth of the paths, when a vineyard is planted. The different kinds of plants. Of planting between, and of digging up old Vines, and planting again.

The trenches ought not to be opened, till after the ground that is designed to be planted has been marked out, to the end that a length and breadth, proportionable and uniform, may be given to all the rows and paths, as much as the ground to be planted will permit. And forasmuch as the Vine receives its nourishment in the trench, it will be proper to give it some inches in breadth more than to the paths.

The most common practice is to allow five feet in breadth for the trench, and as much for the path, when red wines are planted, especially the Auvernats, whose branches ought always to be trained pretty long. This is the best method for this sort of Vines, and the plants ought to be planted two feet six inches distant one from another. Some do not exactly observe this distance; they allow but four feet and a half for a trench, and the same for a path.

There are also some that allow but a foot and a half distance between each plant, when the trench and the path have no more breadth than that which I am about to mention; but the Vines planted so close together ought, of necessity, to be twisted circularly; and as their roots will in a few years run one into another, the Vines will not last so long; besides, they will require to be a little oftener and more plentifully dunged, than those that have been planted at a greater distance.

Others, on the contrary, allow near six feet for the breadth, and sometimes more for the trench, and the path, but this certainly is greater than is possible to dig or cultivate between the stocks, which is the best manner of performing this work. And when they dig otherwise, they will have a great deal of trouble to work to the middle of the trench, which nevertheless ought to be as well digged as the rest.

But the vigneron of Burgundy do not dig the whole ground, for when the distances are so large, they content themselves to touch but lightly the middle of these trenches, and only dig about the rows of plants. It is then advantageous for the citizens not to give so much breadth to the trenches.

Those vigneron, that purchase or rent vineyards which have the trenches so wide, pluck them up oftentimes, that they may be able to plant others there, where they allow much less breadth for the trenches, and the distance between the plants without concerning themselves about the Vines lasting the less while. But the citizens ought to follow a better method, which is, to give five feet for the breadth of the trench, and as much to the path, and two feet six inches for the distance between each plant, especially when one plants Vines of Auvernat, because these will furnish layers, so the trench must necessarily be larger, and the plants at greater distances the one from the other, that they may find more nourishment, and that the shoots of the Vines may be extended the better.

A vineyard planted after this manner will last longer, will defend itself better against the winter's frosts, will produce finer and better fruit, which will ripen better, and of consequence make better wine; and also the vigneron of Burgundy would find their account of planting their Vines in this manner, in that they would have fewer Vines to tie, to prune, and to disbranch, &c. because there are a great many fewer plants

plants in those whose trenches and paths are wide, and the plants less crowded, and for this reason there would be but few vigneron but would be of this opinion.

When I say, that when one plants Auvernats, they should have five feet in breadth for the trench, and as much for the path, and two feet six inches distance between each plant, I speak of those Vines planted in a very good bottom of earth, because they will last many ages without being renewed after the usual manner.

For as to those lands where one is obliged to renew the vineyard in about twenty or five and twenty years, it will be sufficient to allow four feet and a half for the breadth of the trench, and the same for the path, and twenty inches for the distance between each plant, because these Vines will not last a very long time, by reason the roots will grow large, and spread far in the earth, in such a manner, that they would injure one another. I suppose, nevertheless, this land to be passably good, for otherwise the breadth of the trench and the path must be greater, and the distance between each plant, or the vineyard, must be the oftener dunged.

There are two sorts of plants, those from cuttings, and from layers.

The cutting is a young shoot of the same year that has no roots; they always leave at bottom a knot of the wood of the preceding year. These are the most commonly used. They give it no other management than to cut off the claspers and the tops, at the same time that they take them off from the Vines, and lay them down in the earth in a bundle, when they cut them before winter, and cannot plant them till the spring.

This plant is good, and commonly succeeds when it has been well chosen, being planted in lands well disposed and well cultivated; but yet there is an inconveniency in using it, and that when it is to be planted in lands that are naturally moist, or that retain the water. If it be planted early, and there fall cold rains in great abundance, the plant soaks in the water, and the skin or rind comes off, and it perishes instead of taking root; and if it be planted too late, and the great heats and droughts overtake it before it has put forth buds that are passably strong, it is scorched, wherefore it is better to make use of the second species of plants, not only in these sorts of lands, but all others.

The layers are the long shoots of Vines of three years growth, which have been layed down in the ground, and have put out small roots; these are better, and less liable to fail; they may be planted at all times in winter and in any kinds of lands, provided they are such as do not retain the water. In this case it were better to wait till March to plant them, or at least till the ground appears healthful, for we should never plant in ground which is very wet.

Before the layers are planted, they ought to be pruned, that is, to cut off a few of their roots; and when they are weak at the place where they were bent, these must not only be cut, but also the other branches or spurs, leaving that which has the most and strongest roots.

The layers are a great deal less subject to soak in the water than the cuttings, because having roots before they were planted, they make new ones sooner than those which have none.

It is true, these layers are more rare than the other, but it is an easy matter to render them common enough, because one may have whole acres of them, and all the precaution that is necessary for it, consists in making layers, when they are well grown, from the shoots.

These may be planted in two different places, either in some piece of land designed solely for this purpose, or in the middle of each ridge, at the time that a vineyard is planted.

If they be planted in a particular piece of ground, they must be laid in rows betwixt the Vines, and

there so, that betwixt each row and the shoot there may be a sufficient distance, that the shoots may not hurt one another, and that the vigneron may have room to pass between them when he is trimming them; for he must hoe them three times a year to hinder the weeds from growing about them, and choaking them, and depriving them of a part of their nourishment.

This portion of ground is a sort of nursery, since the gardeners make them, that they may have plants to plant in those places where they are wanting.

I am also of the opinion, that it is the prudence of a citizen to have on his estate (especially since the cuttings do not take root but with difficulty) a place where he may always have layers in as large a quantity as he pleases, or shall suffice for all those that shall not succeed, at least if they be not well chosen, and which require a particular care in their cultivation. I shall consider, at the end of the following article, after what manner we should plant the layers in the ridges.

It is for the interest of a citizen to order his affairs so, that his vineyard may be always full of plants, to the end that it may produce a good quantity of wine; because it often happens, notwithstanding all the precaution that can be taken to keep a vineyard well furnished, that it will want to be supplied, by reason of the quantity of plants that die from time to time, because one cannot always supply their places by the means of layers; and likewise sometimes there will not be wood enough upon the Vines that are near for that purpose, and that it would not be proper to make use of the top of the shoot, for several reasons that might be given, and therefore it will be proper to place plants between the others.

Some vigneron will say, that it is very rare that these middle plants succeed in a vineyard where they are planted; to which it may be answered, that it is true, that a middle plant may not succeed, when the earth has not been well prepared before the planting, or when it has no other management but that of the vineyard in common; but it is very certain that it will scarce fail, if care be taken, after the vintage, to pluck up the dead shoots, to open the earth to a good depth before winter, not only to the end that it may mellow, but also that the Vines may not be damaged in cutting off part of its roots, by which it would be greatly weakened, if it were not done before the spring; and if in every hole were put a basket of fresh earth, or about the twentieth part of a scuttle full of well rotted dung, especially when the plant is set in stony, clayey, or gravelly ground.

I have seen among Vines very strong in wood, and of a hundred years of age, a middle plant very strong to the third eye, and which always continued to do well; and I can affirm, that these Vines are planted in as strong lands as any are in our plot of vineyards. Now if the middle plant does well there, as it is certain it does, we may take it for granted that it will still do better in those lands which are light; and hence it is, that there is not any land where one may not plant, or where it will not succeed.

Perhaps the vigneron may say that a middle plant will be worth nothing among young Vines, because these push with so much force, that their shoots would choke it.

I agree that it may sometimes so happen, but then this is a proof that the year following there will be found in the vineyard wood enough to make layers there. Therefore it would be useless to set a middle plant, because it is more likely to fail, and likewise it will not produce fruit so soon as the layers, which produce it the same year in which they are made.

This reasoning is more just than the consequence that they would draw from thence; that is to say, that it would be useless to plant a middle plant; for if a vigneron should every year cut off the wood of the vineyard, which might serve for the making the layer, and not set a middle plant there, the vacancy that would

be there, would never be filled; and this is the reason that a middle plant should every year be set in the empty places, to the end that they may be filled out with the layers.

Of the time and different manners of planting a vineyard.

Lands being of different natures, there ought also to be different times of planting.

In lands that are sandy, or full of flints, the bottom or soil of which does not retain the water, one may plant and interplant after the severity of the winter, without being under any apprehension of the plants not succeeding; because these sorts of lands, never retaining the water, are always wholesome at the bottom; and therefore the plants set in them will succeed.

They do not ordinarily plant in the lands of Olivet, St. Mesmin, &c. whole pieces of Vines entire in the places where they have been already, because the custom is, not to pluck up in these lands those plants that they find good either as to wood or kind.

As for myself, I have always found, that these different stools, mixed among very small ones, make a grotesque figure in one and the same piece of land, and could never approve of this ridiculous method.

In strong lands, or such as retain the water, one ought not to plant but in the month of April or beginning of May, because it is not easy to make a Vine take root in these sorts of lands, the year being often very hot and dry, or very rainy, which are equally to be feared, in respect to the plant set in them.

And as, in an estate of but a small extent, it often happens that the lands are of different natures, and that of consequence the plants of one certain species will not do well but in one part of these lands, and will succeed ill in another, and that the seasons are different one from another, and since they too often happen to be either too hot, or too cold, and rainy, and that the kinds of the plants are good or bad, according to their nature, and that of the ground on which they are planted, and the disposition of the season, I am of opinion, to be more certain not to plant any plants but what will succeed, and to have always some vintage to gather, that it will be proper to plant several kinds of plants, according to the lands that they will agree best with, especially if we be not very sure, that one species of plant will do better than all others: in such case, we should plant none but that which may succeed there.

When I say that it is often advantageous to have different kinds of plants in a certain extent of land, I do not mean that you should put many kinds of plants in one and the same ridge, or in one and the same row, as is common for vigneron to do, when they plant vineyards for those who are obliged to make but one sort of wine of all sorts of Grapes, which, nevertheless, they would have passed for pure Auvernats, although there is not in it perhaps above a third part; but I mean, that in every different kind of land there should be planted but one kind of plant, to the end that, every kind being separate, we may, in the time of vintage, easily make such wine as we desire; which will be very difficult, if all the different species of plants be planted confusedly one among another; for there will scarce be found among the vintage gatherers either men or women, such as have skill enough to distinguish them, and besides, if they had, it would be a loss of time.

A vineyard may be planted after two manners, either upon the even ground, or in open rows.

In planting upon the even ground, when the land has been levelled and marked out, they make a hole with a spade to put in the plant, but it ought nevertheless, to be supposed that this land has been prepared, and well trenched.

The manner of planting a vineyard in open rows is almost the only one in use in the Orleannois, and is, without contradiction, the best; in that it is certain,

that in planting in this manner, the earth has been opened and removed even to the bottom, which by this means will become better furnished, and the roots of the Vine will be capable of spreading themselves.

The best time to plant cuttings, which have been bundled and buried in the ground, is when the rind swells; which may be known by a kind of protuberance rising round about the wound, and also by the buds being just ready to open; and that the cuttings may not dry too much, they ought to be kept for some time in a vessel full of water, and not to be taken from thence, but as they are planted, for if the heat should shrivel those that are planted, they will not so readily take root, and many of them might die.

For this reason it is better to plant a vineyard in a rainy moist season, or at least cloudy, than when it is too hot, or there is a too drying wind.

They commonly make use of two different utensils of iron to make the hole where they put the cutting of the plant, either a spade, or a large kind of pick-ax. The first is the most proper to make good work, provided the earth be wrought the whole length and breadth of the trench, and also the depth that the plant is laid, that is to say, as far as the hollow of the earth.

When they make use of the second utensil, it is commonly with a design to make bad work, for the lazy vigneron content themselves in making a hole to put the cutting of the plant in, without digging the rest of the ground.

But by this last way of planting, it often happens that the young roots of the plants finding nothing but hard earth, into which they are not able to penetrate, it is impossible that they should be able to extend themselves as they would do, in a land that has been exposed to the air, frosts, &c. by the good digging that has been given it, when the trench has been dug with the spade the whole length.

Of gathering the vintage.

The vintage of the Auvernats being the most precious of all those which we have to make in this plot of vineyards, in order to have good wine, we ought to attend the maturity of the Grapes.

And as there are certain soils, where the Grapes, having been cut a little too green, are too much fermented in the vat, and others, on the contrary, cut very ripe, are but little fermented, which keep the better; it is absolutely necessary that those who have those vineyards do carefully apply themselves to be acquainted with the quality of their ground.

But one may say, in the general, of all the good Auvernats of this country, that they ought to have always one point of green when they are gathered, particularly when the year has been hot, and the lands where they grew have been fat, or very much dunged; for it is not sufficient, when one would have good wine, to cut the Grape in its degree of maturity, but he must take a fit season to do this in. As thus, one ought neither to begin nor continue to gather when it rains, though many are not very scrupulous as to this point, for they say the wine will sell never the worse for it.

I own that it may sometimes happen so, but it ought to be allowed me that it has a bad quality. One ought also to see to it, that the dew that falls often very plentifully in this season, be entirely dissipated, and that there be no dew either upon Grapes, or the leaves of the Vines, for it is found by experience, that for the little quantity of water there is in this sort of wine, it loses a great deal of its quality.

Therefore the season cannot be too fine for cutting the Auvernats, for this reason: in a great many vineyard plots in this kingdom, as in Burgundy, and other places, where the wines have great reputation, they do not gather their vintage, but during the finest part of the day; that is to say, the gardeners begin their

work very late, and leave off some hours before sunset, and the wine is the better for it.

It is true, that sometimes it is good to wait for the falling of the rains, but this ought to be some weeks, or at least many days before the vintage, and not in the time of gathering.

As for example: when no rain has fallen for a long time, and the Grapes have been so shrivelled by the heat, that there is scarce any thing but Grape stones, and a tough thick skin, if one should gather them then, they would yield but very little wine, and also it might turn to a tartness, as it happened for the most part to the red wines of the year 1718, which was extraordinary hot and dry.

So then we ought not to gather the Grapes so soon as the rain that we have waited for is fallen, because the Grapes ought to have time to have the advantage of it, which may be known when the berries grow large, and fall upon the ground.

As to the other sorts whether red or white, they may be gathered with less precaution, but they must always have their degree of ripeness, according to the different lands on which the vineyards are planted.

Of the wines made in Orleans.

For a long time, at Paris and other places, there have been those who have endeavoured to decry the wines of our vineyard plots, especially the red wines. In the mean time it is observable, that those who speak of them with the greatest contempt, cannot do without them, but procure them as they did formerly, either to put off their weak wines, without colour, or that have some other faults, and also to preserve the finest, most delicate, and most celebrated.

For the wines of Burgundy are no sooner brought in, than they mix them with our wines to drink them, so long as they last; and there is this to be said of our wines, that there is not one single wine merchant at Paris, who has not our wines in his vaults, not only for mixing with others which are meaner, but for selling without any mixture; for tho' they have much strength, yet for all that, they do not fail to sell them pure, as well for their tables as their offices, to those that have the curiosity to drink a wine that is good, natural, and without sophistication.

The Rapes which are yearly made, and the great quantity of wines, both red and white, which they are so solicitous to purchase a long time before they are made, in order to transport them from Paris into Flanders, Holland and England, and as far as the American islands, where they drink good to the very last drop, are in my opinion, sufficient proofs that our wines are not so contemptible as they would represent them.

For it must be owned, that if they had not such good qualities, or if they had any fault, they would not come in search of them so far, and would not take such care to furnish themselves with them in time.

Some say that our wines being harsh, red, and too violent, they are not so agreeable to be drank, and that those that drink them to any excess, find themselves incommoded, which never happens to them when they drink the same quantity, or even a greater, of the wines of Champaign and Burgundy, and many other vineyard plots of the kingdom.

I answer, that these pretended faults are the real qualities of our wines, and those are what cause them to be so much sought after; for this very colour and harshness (provided that it be not too much fermented in the vat) serve to give a quality to other wines that are weak, which would never be vended to any advantage without being mixed with others.

Besides, if the harshness of them, which they sometimes have, be their fault, this is not always so, it is but accidental, and may be prevented by letting them remain less time in the vat.

As for the inconvenience that those are sensible of, that drink too much of it, it is a very easy thing for

them to remedy that themselves; they need only drink less of it, and then it would not incommode them.

As for example: aqua vitæ is not drank in so great a quantity as wine, nor a strong wine as a weak one. When the wine is very strong, they ought to drink water with it, or drink less of it, then it would nourish a person, instead of wearing his body, or stupefying his spirits. Thus, when one is sensible of any bad effects from our wines, it is not from their quality that they proceed, but from their quantity, which people know not how to use rightly.

Whatsoever ill-founded prejudice may be taken up against the wines of our vineyard plots, it must nevertheless be allowed that we have the advantage over the greatest part of other wines, that we are able to make them such as we would have, and such as are demanded; that is to say, a delicate wine fit for present drinking, red without being harsh, and more or less hard, without losing its quality, and thus we are able to make a wine equally good to drink through the whole course of the year, and also for many years after.

There are in this kingdom many vineyard plots, the Vines of which have this bad quality, and yet these are the wines that are so much boasted of, which will not keep the year without spoiling, if they were not preserved by ours, which have more of the quality than they.

But if those who put so great a slight upon our wines, should say we do not know how to make them, they would reason more justly than they do, when they would have us to believe that our wines are not good; for they ought to allow that they are good in themselves, and we shall agree, that if there is any fault in them, it is by accident, since it only proceeds from the manner of making it.

Then it must be said, that the wines of Orleans are good, but they make them ill, and then there is nothing more wanting, but to avoid the faults in the manner of making, and that is what I am going to treat of.

We have in this plot of vineyards so many different sorts of soils and plants, that it would not be easy to give a direction for the manner of making the wines from each of them; I can only say in the general, that in order to make good wine, the soil ought to be proper for the Vines, well exposed to the sun, on a gentle declension from the north to the south, rather dry than moist; that the plants set there be of a good kind, and well chosen; that the vineyard be rather old than young, never duned, or but very little, but rather earthed, and always well wrought, and in the proper times to work them, and that the Grapes have a certain degree of ripeness before they be cut, and that they be tunned after they have been trodden, when one would make wine that should have a colour, and not for present drinking.

It is certain that when all these things concur, it will be easy to make good wine; but there are yet other things to be observed, of which I shall speak in the following part of this article.

They make in this plot of vineyards, as well as in many others, both red wine and white; I shall speak first of the red, and afterwards of the white, of which there are a few things to be said.

The best and most precious wines of all that are made in this plot of vineyards, is the Auvernat. Of this there are six species, viz. the Auvernat Teint, the black, red, gray, and two kinds of whites; which are the white Auvernat of Soler, and that of the Low Country.

The Auvernat Teint is the reddest; and as it has always the quality, it gives the colour and the body to the Auvernats, and prevents them from growing rosy. And when it is mingled with the red only, they ought to let it remain in the vat a little while; especially in those years, that there is reason to believe the wine will take as much colour as they would that it should have, or where it grows on a soil where the wine has

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always been accustomed to have colour enough by being tunned but a little.

Some pretend that one quart, or thereabouts of the wine [De Teint] of the tincture, or of [Gros Noir] the large black, to a vat of fifteen puncheons of red Auvernat, will have a good effect.

I own that it will give it a fine colour, without rendering it harsh, provided it be not tunned too long; but as this Teint, or this Gros Noir, have no quality but that of giving it the colour, I am of opinion that the Auvernat Teint, which is very red, substantial, and vinous, produces a better effect; but it requires only to put more of that of the Teint, than of the Gros Noir; because this Auvernat colours a great deal less than those of the two other kinds of Grapes.

The riper both the one and the other are, the more wine they yield, and the more colour they have; and for this reason they ought never to be gathered, but when they are in their perfect maturity.

The Auvernat Teint ought not to be planted indifferently in all sorts of land, because it will not do well in all; and for this reason, those who would have them, ought at first to plant but a few, to see if they will succeed in their lands. Also care must be taken not to mix them with other in planting, that one may the better know what quantity we should put into every vat; which will be difficult to do, if they were planted confusedly with other Auvernats, or red plants, to make thence good mixed wine.

Although the Auvernat Teint is a very good Grape of itself, yet it must be owned, that if too much of it be put into the red Auvernat, it will alter the quality of it; for the last wine is never better, than when it is made without any mixture of other Grapes; and it has ordinarily as much colour and strength as it should have, not only to maintain itself by itself, but also to put off other wines of an inferior quality.

But then I suppose, that this red Auvernat grew upon good lands, for there are some which of themselves do not give enough to the wines that they produce; in this case it is good to plant the Auvernat Teint.

It is true, that this wine being mixed, will not be so fine, as if it were only the pure red Auvernat; but then again, it will maintain itself better; and when one would make an Auvernat, which has a strong tartness and a good flavour, without having any colour, you must put to the red Auvernat, about the seventh part of the Melier, or of good white Auvernat, such as now grows in the vineyard of Blois; but that one may be able to make this mixture, it is necessary that this Melier, or white Auvernat, be ripe at the same time as the red Auvernat.

A wine made after this manner, is so excellent, and so disguised, that it is made to pass for pure Burgundy wine; and is sold at Paris and other places as such, in wickered bottles. The best wine conners are there deceived every day.

The Auvernat, without distinction, is red; they also name it from its skin, which is brown, because its colour is not of so deep a red as that of the Auvernat Teint, and because it is deeper than the gray Auvernat, which is almost quite white, and that too when it has been tunned very much. This kind of red Auvernat is the most common among the black Auvernats, and is one of the best wines that grow in this plot of vineyards.

The [Auvernat Noir] black Auvernat is very uncommon in this country, and known by few persons; its berry is rounder than the other Auvernats; its skin is as black as jet, and that is the only thing that it is known by. There is also another species of it, which some vigneron call the Auvernats of Tours; it differs nothing from the red, but in that its wood is very big as well as its fruit. The Grape is long and well filled; and it were to be wished, that this kind was not so scarce in this country; for it is the finest, and one of the best that we have.

The gray Auvernat is neither white, black, nor red, but of a gray or pearl colour, when at the greatest

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maturity. But some have made this observation, that in certain lands this colour becomes black in about twelve or fifteen years after the planting of these Vines, but nevertheless without losing their quality. The change of the colour does not come universally. I have seen vineyards very old, that did produce the Auvernat of this quality.

When this gray Auvernat has been made off-hand, or when it has been tunned but a very little while, and it is once gone from this vineyard plot, and is denominated by a borrowed name, it is an easy matter to make it pass for such a wine as is desired, whether it be sold as it is, or whether it be mingled with others of a higher colour. But this mixture must be made in such a manner, that the quantity of the gray Auvernat be not absorbed by the red that is mixed with it.

Of making wines in Orleans.

The Grapes being cut, and carried from the vineyard to the press, they tread them either in a scuttle, which they place there, or in a vat, when the gathering of the vintage is finished; or, in fine, they cast them into a trough of a wine press to be bruised. Also sometimes they carry them directly to the press; but this is when they would make wine fit for present drinking, and that it is not fermented in the vat at all.

Those who make use of a scuttle to bruise their Grapes, cannot possibly tread the Grapes well, or at least they will be a long time in doing it, and have a great deal more trouble, in that they are obliged to raise up, with all their strength, the puncheons in which they tread the Grapes, to cast them into the vat with the marc, in order to work it all together.

The manner of bruising the Grapes in the vat when it is filled, is much worse than the first; in that, notwithstanding all the precaution that can be taken, and whatever time is allowed to endeavour to do this work well, it is absolutely impossible it should succeed; for when the wine has been tunned as much as it ought, and they have put it on the press with its marc, there will be a part of the Grapes that have not been half bruised, and this causes the marc to yield less wine, and there is not all the colour that it might have; and therefore the Grapes ought never to be bruised this way, when it can be done otherwise.

But if this is a loss to the citizens, not to draw from the marc all the wine which it ought to yield, if all the Grapes had been well bruised, yet it affords an advantage to the vigneron, in that his drink will be so much the better.

As there is an inconvenience in treading the Grapes, either in a scuttle, or a vat, as I shall make it appear, it will be better to make use of a wine press; that is, without contradiction, the best way to bruise the Grapes.

And besides, a wine press will serve for four baskets, when the other will not serve for two, if they make use of a scuttle; for according to the measure that the Grapes are bruised in the wine press, the wine falling into the vat, does not rise above the Grape; by which it may be more easily known, when the Grapes have been well or ill trod before the marc is turned into the vat; or it is a great deal more easy to push it with the foot, when the trap door of the trough is lifted up, than to lift up the whole with bodily strength, as they are obliged to do when they tread in a scuttle.

The trough of the press ought to be set in a kind of litter, and placed upon, or over the vat; but when the covering of the structure, where the press is, is low, it must be placed over the middle of the press without a litter; then there will be a little more trouble, because it must be emptied into the vat with a bucket or scuttle; but this is no great matter, there are hands enough to do this work.

The Grapes having been trodden as before, the marc may be thrown into the vat, either with the Grape and

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and skins, or separated the one from the other; this depends on the manner after which one would make the wine.

When it has been tunned a considerable time, the wine is less green, less subject to be ropy, and better for keeping, than if it were done off-hand, or fit for present drinking.

But if the Grape be tunned too much, it takes from it much of its quality, because it leaves a harshness which renders it not fit for drinking for above a year in certain lands, and in others it never loses the taste of the Grape stone; and when with this excess of the vat, it has a colour as red as ox blood, it is a wine which they call *grossier* or *matin*; and it is commonly said it is better to keep than to drink.

When a wine has this fault, one cannot render it drinkable, but by mingling it with good dry new white wine.

Then it is this excess of the vat which renders our wines hard, and makes them disesteemed without any distinction, although all our wines are not made after this manner. But it is an easy matter to avoid this fault, which renders our wines contemptible.

There are those who tun the Grape stone with the skin, and would give to their wine only that degree of the vat which it ought to have; and not to be strong, they draw it out from time to time by a pipe, or by some little hole which they make in the vat, but this I do not approve of, for reasons to be given in the following article.

Others make use of a Vine prop, or some other piece of wood, which they thrust into the vat, from whence they draw it out quick, and let it drop into a glass, where they examine if it have colour enough, and if it makes a circle of scum, and boils and bubbles, which they call *faire le roue*: others watch till the marc is risen to such a height, and make a judgment by that.

As for myself, I am of the opinion, that it would be a surer way to thrust one's hand a pretty way into the vat, (which I suppose to be raised, and to have been worked,) to take from thence a handful of the marc, and to put it to one's nose, as the dyers do, to judge of the disposition of their vats; then one may know if the wine be made, and if it has colour enough.

When it smells sweet, you should let it work a little longer in the vat, until it has lost that smell, and has a strong scent that affects the nose; then it ought to be taken, for one quarter of an hour at most is sufficient to force it.

A wine taken in its proper degree of the vat, will never taste of the Grape stone; it will be always fit to drink, and also will keep good for many years.

I agree also, that the wine that has been tunned too much, becomes tart and harsh, and that is what takes away its quality; and as it is the Grape stone, and not the skin, that causes this tartness and harshness, the means to prevent this inconvenience is, in being very careful as to the degree of the vat that is given to the wine.

But as one may often be deceived in giving it too much or too little of the vat, I think the surest way would be, to stone the Grapes when they are trampled, before they are put into the vat.

This work would not be so much trouble as it may be imagined; for one stoner would suffice to employ one treader, let him tread as fast as he can.

When the Grapes are bruised in a wine press, several may employ themselves in stoning. One method of doing it is, to put them into a basket plated, &c. about six feet long, four feet broad, and ten or twelve inches high; and that this may not be any incumbrance, it may be placed about the middle of the press, and have two men to sift and separate the skins from the Grape stones.

I find that a cribble is much more convenient, for it takes up less room, and there needs but one man to work above, and the work will be as easily, or more easily done.

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I have seen many of these cribbles, but that which I am going to describe, appears to me to be the most commodious.

The cribble for stoning the Grapes ought to be made with brass wire, because this is more pliant, and does not rust so much, and lasts longer than iron wire. The holes ought to be an inch in breadth, almost of an octagonal figure; it is worked upon two hoops joined together, the one upon the other; and when it is finished, it is to be covered with a third hoop or band, that is about four inches high.

As the marc is falling in by the wine being pressed out, and is risen to the height of the cribble, they put under to support it a band of wood, or little hoop, two or three fingers high, which goes round at the bottom of the cribble; and besides this, four round iron bars of the thickness of a little finger; because if they were broad, the skins of the Grapes would rest there, which would hinder the other from passing.

It is proper to put these iron bars in such a manner, that two of the four may sustain the other two, and that they may be all of one length.

The ends ought to cross the two hoops, and to cover the third; and they must be joined to many places of the trellis of brass wire, which may be double or treble.

The wood of the hoop ought to be notched in two places over against one another, and about an inch in depth, and three in breadth, according to that of the staves upon which it is to be placed; and these staves should be placed upon a scuttle resting upon the vat, upon which they tread the Grapes.

It is also proper that these notches be plated with iron, and that they have two handles or grasps of iron, pretty thick and round, to prevent the hurting the hands of him that manages the cribble, because it is weighty, and there is often occasion to remove it from place to place.

This cribble may be about a foot in height, eight or nine in circumference, and an inch in thickness at the top, and something more at the bottom, because of a band of wood that is placed round about to sustain the trellis, as I have said before.

The treader having bruised the Grapes, instead of pushing the mass in the vat with his foot, as is done when he would tun the Grapes with the skin, it is taken either with a bowl, or a pail, or with the hand, and put into the cribble; then the stoner separates the marc as well as he can, the skin from the stone, and casts the latter into a vessel that stands near him; and when that is filled with the Grapes, they carry it to the middle of the press in a pail, or in a basket, and from time to time empty into the vat, the skins and the wine which are in the vessel, which has been stoned.

The business of the vintage gatherers being finished, they put the marc and all the stones that are upon the middle, and they lower the plank to draw from thence the wine that is found there.

Some give it another bruising, but I believe very unprofitably, for that cannot get out much wine, and also that which they get from these stones has nothing but a harshness; but nevertheless one may, because there is a little of it may be mingled with the other that is in the vat.

One marc of Grapes, which one may reckon ten poinçons, may yield about fifty pints of wine, or thereabouts. This depends upon the size of the Grapes, and the heat which has been during the time of the vintage gathering.

The wine being boiled with its skin, it will be necessary to observe, from time to time, if it have colour enough, and if it be sufficiently made to be drawn off; and when it is found that it is not yet red enough, the marc must be thrust down in the vat in order to give it the colour, and never to be forced; you may also cover the vat with a coarse linen cloth double, and put the board of the press upon that, in case one is apprehensive that it will lose a part of its strength.

It is not the same, when the stones are left and put into the tun with the wine, because then they will easily force; whereas this inconvenience never happens when the Grapes have been stoned, for this reason it ought always to be done: one is sure to have wine well made, and such as may be kept many years without spoiling, according to the time that it has been left to ferment.

And if all our red wines were made in this manner, we should not have occasion to say, as it hath been said for a long time, that our wines are harsh and coarse, for it must be agreed, that it is nothing but the stones that gives it this bad quality; which is however accidental, since I have offered a method to remedy it, which may easily be put in practice.

Many citizens complain, that the merchants will not give a greater price for the wine whose Grapes have been stoned, than for that which has not, but in the mean time it is better; it does indeed cost something more in making it after this manner, in that it takes up more time in pressing.

Upon this account many citizens have discontinued the stoning their Grapes, but I do not approve of that; we ought to spare nothing to make good wine; and I am persuaded that there will always be found merchants reasonable enough to make a distinction between a wine, the Grapes of which have been stoned, and that which has not, not only by their taste, but in the price too.

As the Grapes that are fermented without their stones are subject to grow ropy, it is good to prevent this inconvenience in gathering them before they come to their full maturity, and to give them but little fermentation; it can then never be too thick, because the Grape stones not being there, it is impossible they should force it.

During the time that the wine is working in the vat, one may pierce the casks, and put into each of them about a pint of water; it should be boiling hot, or at least very hot; this will purify the vessels, and render them more tight.

The hole of the bung being well stopped, as soon as the hot water has been put in, it should be shaken and turned on all sides, to be able to see if it has vent in any place.

Some pretend, that this hot water will take away the taste of the casks, but I very much doubt of this.

In order to make this experiment, it is requisite, that one be first sure that the casks have any bad taste. When the casks have been seasoned and drained as dry as may be, they must be placed upon the stillings, and there set firm with stones, or some other thing, to hinder them from rolling while they are filling.

The basket that is hung up by means of a prop to receive and hold the Grapes and skins which fall from the middle of the press into the wooden pipe, ought to be well closed up to hinder the stones from going into the casks when they are filling; because when the wine boils, it casts out the scum, lee, skins, and stones, in order to purify itself; and sometimes a small quantity of these is sufficient to stop entirely the holes of the casks.

But to prevent this accident, one may nail, at the small hole, at which the wine runs down, a small lattice of brass wire, the holes of which must be very fine; then there would but a few of the skins pass, and no stones; and the basket, which is very troublesome when one would empty the pipe, would be useless.

One may yet, for the greater security, have another grate, and fasten it with nails, above the socket on the inside of the funnel; but this grate must be raised three or four fingers, to the end that the skins may not hinder the wine from passing.

Before the marc is begun to be put upon the middle of the press, I suppose the press to be in such condition, that nothing is wanting of all the utensils that is necessary, for it would be an imprudence to have at this very moment, any thing wanting that is necessary for the making a marc.

The screw being the most brittle and most necessary part belonging to a press, a master ought always to have one in reserve, ready to put in, in case of need. In like manner the feet of the beams should be examined some time before the vintage, that they be not rotten, for that is the place they commonly fail in; and when this happens, it is not so easy to remedy it as it is to remedy a broken screw.

In order to make the beams of a press last a long time, when they are good of themselves, it ought to be so contrived, that they may always have the air under the middle of the press; especially at the end of these pieces, there ought not to be either any marc or earth, and therefore it should be hindered from falling there.

Some make a small piece of brick work round each of these beams, and that is the best precaution that can be taken to make them last a long time.

After the press has been put in order, and the wine has had its degree or time in the vat that it ought to have, or they can give it, it must be put upon the middle of the press.

When it is at a great distance from the vat, they make use of a scuttle or basket, or if it be near, of a pail; which they let drain upon a board, which bears at one end upon the vat, where it is fastened with a nail, or other thing, and the other upon the middle of the press; this board should be bordered on both sides with ledges, strait and well joined, and about an inch in height, to hinder what drains out of the basket from running on the ground.

A piece of wood, with a hollow or channel about an inch deep, would be much better than this board with ledges, for they cannot be with ease so closely joined, but that the wine will find some chinks to run out at, which will not be in the wood thus hollowed.

Some, in order to empty their vats the more easily, put in a pipe, thro' which they draw the wine clear through a little bucking tub made for this purpose; out of which they take the wine in a pail or pannier, to empty it into the casks.

For this purpose the vat must be set high on a stilling or gauntry, and the earth hollowed at the place where the pipe is placed.

Before the wine is drawn off clear, you must always begin to keep off the cover of the vat, in order to prevent the wine from forcing; and this must be done in such a manner, that he who empties has not the trouble of lifting it up so high to put it in the scuttle.

I own that this manner of emptying a vat is very commodious, and shall in the following article speak of the inconveniency that may happen thence.

The marc being placed on the middle of the press, they cover it with a board, with bolsters, cushions, and bags or pillows. There must be two rows of these last, and sometimes three, when the marc is thin, because by how much less the screw appears, by so much less is it in danger of breaking; and as the marc will be thick, according as they have ordered it, there must be some rows of the bags retrenched; for it is sufficient, that there is a certain distance between the wheel and the screw, which would not be so, if the marc were very thick, or there were many sacks.

There is no need to put the ring of the rope into the hook, before the wheel has been lowered on the bags, and that you have examined if all is made even, and that none of the bags are removed.

Before you begin to lower the wheel upon the bags, the screw ought to be well greased above the nut of it, and also below, when it touches the bags.

They also grease that part of the screw that was within the nut screw, before they have brought it down to the point where it ought to be; for the first operation after the plank of the axle-tree has been let down, and before the loosening, the screw must be soaped on the places where it has had none.

White dry soap without oil is the best for greasing the screw, for when oil is mingled with the soap, that draws the rats, which gnaw the screw, and it occasions a gum or thick substance, which makes it go hard when they press the marc.

The trendle ought also to be placed at a reasonable distance from the middle of the press upon the nave of the wheel, and being well rubbed with hog's lard, the trendle will turn the better. Others make use of an iron crow, which at least produces as good an effect as the nave.

When the staves or rammers are rather long than short, and that the trendle is pierced with a height agreeable to a man of a middle stature, they will have the more force to press the marc.

After the plank has been let down, and the troughs filled to a pannier or thereabouts, and they have afterwards added the wine that comes from these pressings, they give the first squeezing, which ought to be followed by three others in a short time, because the Auvernat having in it much fire, its marc would dry quickly, and yield much less wine, if there were much time between these pressings.

It is not enough to grease the screw of the press the first operation, before the balance is let down, when it is a wheel press; it ought to be done from time to time, especially when the screw is perceived to be rough, or squeaks in the nut, when the trendle is turned.

Some, before they give the marc the last operation, barbager; that is to say, they work it, or prick it with an instrument of iron, but without touching the sides, because they chuse to hinder it from falling on the middle. They pretend that this little squeezing makes the marc yield about two pints of wine the puncheon.

I have never made the experiment, but this is seldom practised but in the marcs of white wine, because they are thicker, and not so hot by much as those of Auvernat.

The last operation or pressing being given, you may wait twelve or fifteen hours for taking off the marc, that it may have time to drain; and they seldom do it sooner, except they want the press for making other wine.

Although the wine that comes out of one vat is the same, yet they give it two different names; the one they call unpressed wine, and the other the wine of the press.

The first is that which comes from the red or white Grapes, when they have been trod, whether they have been tunned or not, and the second is that which comes from the marc after the pressing. As this last has always a great deal more colour and harshness than the first, they mix them together, to the end that they may make an equal wine; and if they do not do this, they would have one part of the wine of the same vat too delicate and weak in colour, and the other too red, and too harsh, which would not be fit for the merchants, who are for an equal wine.

When I say the wine should be equal, I mean only that of one vat, and not of one whole cellar; for as all the wine that one buys cannot be all spent at the same time, and that the merchants search sometimes for wine high-coloured, and a little firm, and sometimes for a wine more delicate and fit for present drinking, therefore it is, in my opinion, the prudence of a citizen to have tuns of different degrees of colour and firmness, that the more delicate may be first drank, and the firmest some time after, or the year following, for most persons love old wine better than new.

But it is yet more advantageous for a citizen to have wine that is rather a little firm and too delicate; because, if that be not sold quickly, it may grow ropy, or be spoiled; when, on the other hand, that which is well mixed will keep a great while, and he may sell it a long time after.

It is true the merchants often slight, or rather seem to

slight than reject, a wine that has been but little fermented; but it is very often nothing but a little chicanery that those make use of, who are employed to purchase wines to buy them the cheaper; therefore we must give them leave to say what they will, but always give the wine something of the tun; because if it be not sold at first, it will at last; whereas, when it is made for present drinking, it must be sold as soon as may be, and perhaps under price.

Some persons, out of thriftiness, or rather sordid covetousness, fearing to lose a little wine, never entirely fill their casks till the wine has cast forth its greatest fire, i. e. they will not make it boil till it has no force left; and there being only one pannier full of wine put into the cask the next day, or two days after it has been filled, that it has not the force to warm it again sufficiently to make it boil.

This way of managing wine is very wrong; for it causes all its excrement to remain at the bottom of the cask, which augments the lee, and often contributes to the spoiling the wine, and to keep it for a long time foul, which therefore the merchants reject.

It would be much better to fill it presently up to the bung with the pressurage, or with what has been pressed, which is taken from the pressings that they give to the marc, because the casks being always full, the wine purifies itself the more, and becomes clear in less time, and of consequence is more palatable, and may be sooner sold.

It is not enough to fill the casks up to the bung the first time that the wine is put into them, they ought to be refilled many times; that is to say, as soon as the boiling is over, wine must be put in to excite it to boil; and the same thing is to be done the next day, and afterwards for eight or ten days every other day.

The necessity there is of filling the casks as soon as the new wine has been put in them, is proved by the accident that happened to the wines in the year 1718, when the season was too hot and dry during the months of July and August.

The wines were then so extreme hot as to boil very low in the casks, so that many who had neglected to fill them at first up to the bung, had their wines turned sour, which did not happen to those who had used the precaution of filling them to the bung, and keeping them full; and for this reason, those who have many tuns of wine ought always to take of the last they have made to fill all those puncheons of the other tuns; and when a person has but one, he must put wine into a cask called a gueulebée, to fill those puncheons as far as the bung, as soon as the wine has done boiling; then the wine that remains must be put into the casks of gueulebée, or into a very close vessel, for fear of its evaporating or losing its spirit.

I will say, by the bye, that many deceive themselves in making wine these hot years; for they let it ferment but a little, because it boils as soon as it is trod; but this is but a false boiling, which comes rather from the fire that is in the Grape, than from the working in the tun, therefore it ought to be tunned a considerable time. It is in such years the Grapes should the rather be stoned, and the wine sufficiently fermented.

It is true there is some inconvenience in filling the casks up to the bung the first time the wine is put in, because it is impossible not to lose some of it, for it will mix with the scum and the lee which come out at the bung; but this inconvenience may be remedied by setting gutters above the bung, and pans or vessels of wood under the gutters, to receive all that which comes out.

And whereas some pretend, that lead communicates an ill taste to the wine, it is the surest way to have them of pewter, in such a manner, that nothing but the end of the socket may enter into the hole of the bung, for if the hole be made larger than that the socket may play within it, the gutter will be useless, because the wine would run out between the wood and the socket.

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There must also be a vessel called *gueulebée* to empty these vessels in as they fill, and it should be covered with a thick double linen cloth, and closed or fastened all round about with a hoop to hinder the wine from growing flat.

The lee descends by little and little to the bottom of the casks, where it is joined with the scum which there falls together, and is incorporated with it.

Some days after, the wine being grown clear, they empty the vessel, and the lee remains at the bottom. This wine may be put into a vessel by itself, without mixing with the wine which is in the casks out of which it came. Some say this collected wine is the more fine and strong, and others say to the contrary; but they may say what they will, for it is always true that this wine is very good, provided it has been kept very close in the vessel where it was collected.

And I believe that one might, without any scruple, make use of it for filling the wine; but as to this, you need not consult either the merchants or the vignerons, since the one has not judgment or sincerity enough, and the other are too much interested; and I speak with a knowledge of the matter, founded on the experience I have had many times, and without any interest but that of the public.

Those who, from a covetous temper, will not be at the charge of procuring these gutters and vessels to receive the wine of the casks while they are boiling, have no skill in it; for the wine, which they would save by this means, would make amends entirely the first year for the expence they would be at in procuring them.

Others, that are afraid that they shall not sell their wine, say that the merchants have always an opinion in favour of that wine, of which the two sides of the bung of each cask are filled with scum as far as the first bands or circles, and that they have a quite contrary opinion of those where it does not appear.

It is true that formerly they did mind this, and their opinion might be well grounded, because they never made use of these gutters; but at this time their opinion is altered, for they are persuaded that these gutters being in use, a cask may have cast out all the scum, without its appearing at the sides of the bung, because it falls into these vessels that are set to receive it, and likewise that all the wine that is there is well mixed.

Besides, it is an easy matter for a merchant to know if there be much lee in the cask, for he needs only to pierce it into the lee, that is to say, at the bottom, about two fingers of the notch of the cask where the head pieces come in.

The wine having cast out all its scum, it will be proper to taste all the casks into which it has been put; to the end that, if any one be found that has a bad relish, those who have purchased them may be apprised of it, that they may put all the bad ones to their own account.

Some say, that St. Martin's day being passed, you cannot oblige the merchants, who have purchased the wine, to take that again which has been spoiled in the casks, because they say it is the more difficult to remedy it. Others pretend that the merchants are answerable three months after the casks have been filled, provided they have not been removed from off the stillings.

When the wine has done boiling, it must be covered with the largest side of the bung to hinder it from evaporating; and eight or ten days afterwards it must be filled full, and bunged up.

Some make use of bungs about half a foot long, because they can take them out without daubing the casks with the scum; but I am of opinion that broad bungs are better, and to make two holes on the side, the one about the bigness of a little faucet, the other about the bigness of one's little finger, that a pewter funnel may be put in, having in it a piece of pewter foldered about two inches from the end, the holes of which may be as big again as those of a tobacco grater; to the end that, when one uses it to fill the

casks, neither stone, nor skin, nor kernels, nor lee, may pass. The great hole serves for the putting in of a funnel, and the other to give vent for the casks during the time the wine is pouring in them.

The little hole ought to be made at the time that the casks are bored, to put in the wine with the great wooden funnel; for if the socket exactly fills the bung hole, the cask would fill very slowly, if it had not vent given it by the little hole.

When it is done after this manner, the tuns are not daubed with the scum. It is not disturbed, as is done in striking to beat in the bung, and the wine will have less vent.

You must be sure to fill the wine every fifteen day after it has been bunged, until towards St. Andrew's day; you are not to meddle with it any longer, till after the severity of the winter is over, which commonly happens towards the middle of February, because the frost may make it swell.

The Auvernat is not the only red wine that we have in this vineyard plot; there are also other wines made, that have the same colour, but are of a different quality.

There is, for example, the *Bon Lignage*, or the good wine, and that which is made of all sorts of Grapes. As to the first, it is made of the red Auvernat, the Teint, the Gray, the White, the tender Samoireau, the Melier, and all the best sorts of red Grapes.

The second is composed of all sorts of Grapes, good and bad, but more of the latter than the former; whence it is easy to be comprehended, why the one has less of the quality than the other. And as this second is generally spent in the country, they make it all manner of ways, either fit for present drinking, or firm, or hard, according to the occasion they have for it, and the quantity they are to provide. As to the other, they do not fail to make it, and often send it to Paris.

All these sorts of Grapes are not gathered with the same care as the red Auvernat, which cannot bear the water, nevertheless the wine is the better, when the Grapes, with which it is made, are cut in a season that is rather hot and dry than cold and moist.

We have, in some places of this vineyard plot, three sorts of red wines, bearing the same name, which, nevertheless, they distinguish the one from the other. There is the tender Samoireau, the hard, and the Fourchu, which have all three different qualities.

The tender Samoireau does very well in the lands of the Olivet, St. Mesmin, and Clery, where it is more plentiful than any where else. They make of it a particular wine which will keep a long time, provided it have no mixture, and that they give it but little of the vat; this renders it firm, and prevents it from growing rosy.

This Grape may be mixed with the red Auvernat, because they both ripen at the same time. The Samoireau gives the colour to the Auvernat; it sustains it, and causes it to keep a long time; but you must put but a small quantity, for fear of altering or entirely absorbing the quality of the Auvernat, which after it has lost, it also loses its name, and is no more regarded, but as a good *Vin de Lignage*, or one composed of all sorts of Grapes, which is vulgarly called *Vigneron Auvernat*, very different from that of the citizens, which is in a manner pure Auvernat. When one would render this *Vin de Lignage* yet better, he may put to it a fourth part of good Melier.

The hard Samoireau is a little higher coloured than the tender. When it has but its proper degree of the vat, they may mix one or two puncheons of white, and a little less, when they tun it; they should also, when it may be done, take a Melier of a better kind, for this wine has not much fire. When it is pure, and it has passed the year, that quality diminisheth; it is then proper to make use of rapes, not of chips or shavings, but of Corn, without putting Grapes to it, as some do, for that renders it hard and disagreeable to drink.

V I T

It is sufficient to put a third part, or at most a half, of the grains into the puncheons, and after that they fill the wine up to the bung. They make use of these rapes to put off the grounds or bottoms of wine, and the weak ones, which they also mix sometimes with them. The third kind of Samoireau, of which I shall speak, renders them the better for keeping.

The Samoireau Fourchu is the best of the three kind; this is proper to give the colour to the others, and to sustain those that are weak, and to restore those that have any defect.

In order to know the colour, they cast some of it against a wall, and according to the impression it makes, they judge of the effect it will produce.

One single puncheon of that will colour six of white, and sometimes more, according as the seasons are hot, and the quantity of the wine that the vineyard has yielded; this wine is not only good to drink, when it is taken in time, but it serves for a remedy against the dysentery and other maladies; its marc is good against rheumatisms.

This sort has a virtue that is not found in any others, because the longer it is kept the better it is; for it is better for drinking at the end of twelve or fourteen years, than one or two years after it has been made.

Some put it in bottles, but it keeps equally as well in casks, provided care be taken to keep them always full, and to observe that the casks do not want hoops, and it will be proper to put on several iron hoops at each end.

The wine, the marc, and the wood, or rather the ashes of this plant, have also a great many other properties which I shall not relate.

The time of gathering these two species of Samoireau comes much later than those of the first, which ripens at the same time with the Auvernat.

The territory of Mardic is the most proper for these plants, and that which produces the most of it, (I mean of the hard and Fourchu Samoireau;) there is of it at Bou and Checi, and but a very little in any other places of this vineyard plot.

As the Fourchu never produces more wine than when the plants are a little old, many eager to enjoy the fruit of their labours, and their expences, have not patience to wait so long, and therefore they pull up those of them they had, and cannot resolve to plant them when they have them not.

Nevertheless this is a precious plant, and one may judge of it by the effects that it produces, and by the price which it bears, for it is commonly sold for double the price of the best wines of this country; and I do not know, but that those who destroy them, and those that do not raise them, will repent it one time or other.

As there is not much to be said of the manner of making white wine, and having taken notice of it at the beginning of this article, I shall say but little of it particularly.

Although there are many kinds of white Grapes, yet they make, as one may say, but two sorts of wine of them, the one the moist, and the other the dry wines.

The first, such as the Muscat or the Gendin of St. Mesmin, those of Mariguy, of Rebrechein, and other neighbouring places, may be looked upon as the most precious, in that they bring the money into the kingdom, rather than the dry wines, for they send them into Holland, Flanders, England, &c. To render this wine the better, they do not content themselves to see that the Grapes have their perfect maturity, and be half rotten; they wait oftentimes till the frost has taken them, to have the wine which they call Bourou; and in some years they defer the vintage until the fifteenth or twentieth of November, and it is then sometimes so cold, that the icicles hang upon those Grapes that are perished, so that they are obliged to carry fires into the vineyards in great pans, to warm the gatherers.

V I T

It is true, that those who tarry so long before they gather, have a great deal less wine than the others, but then at the same time it is much better, and sells a great deal dearer, so that I believe it comes much to the same, or very near the matter.

The wines of which I am speaking, although sweet of themselves, have, nevertheless, not always the same degree of liquor; this depends upon the condition of the season, that is to say, by how much the summer and autumn are the hotter, the wine has the more liquor, and it has a great deal less when the season is the contrary.

What I say is so true, that the season having been very hot in the year 1719, the sweet wines themselves had abundance more liquor than ordinary, and kept good more than a year; also the dry wines of many places were sweet and clear.

Some red wines were also very soft (which is very rare,) and held good till the month of February in the year 1721. It is true they were thick, and that they did not become clear till the time that they lost their sweetness, which altered their strength.

The softness of the white wines being over, they were nevertheless good, but as there remains a certain flavour, which pleases the palate of most persons, it is best to sell them, or spend them as soon as may be.

One may know by experience that good Grapes almost always make good wine. Among the white Grapes, without contradiction, the best are Melier, and the white Auvernat of the Low Countries. As the white Formentes or Bourgignons, the Maledeueaux, the Tramboises, the white Gois, &c. make a wine which is better to throw away than to drink, yet vineyards of the vigneron are stuffed with these wretched Vines, because they yield more wine, and for the most part, better resist those accidents that happen to a vineyard; for these people have no regard to any thing but the quantity, which is the reason that they do not ordinarily sell their wines to that advantage as the citizens do.

The white Grapes cannot be gathered too ripe, because the riper they are, the more wine they produce, and their rottenness does not give it any bad taste; but when it is begun before they come to their full ripeness, they are subject to grow yellow, yet regard is to be had to those lands of which the wine is subject to grow ropy.

For this reason, when they are gathered, it is good that the Grape has a little greenness, to the end that the wine that comes from them may be able to keep dry, to which the white Auvernat of the Low Countries, and the green Melier, contribute very much; the last hinders the wine from being ropy, and the first makes it clear, and for this reason it is good to plant of it with the Melier, because at the time of gathering, they may be both mingled together, and make a wine without any fault.

One ought to endeavour not to gather the white Grapes but when the weather is fair; a rainy season is not so favourable, for one ought never to mingle water with the wine that one makes, tho' some are not over scrupulous as to this point. It is true, the inconvenience is not so great in respect to the Auvernats, but that should not hinder one from always endeavouring to make good wine, and for this reason it is best to gather the vintage in a dry hot time.

As the white wine is not tunned, when they bring the Grapes in panniers from the vineyards, they empty them directly on the middle of the press, where they trample them with their wooden shoes; the broadest and smoothest are the most proper for this work.

The Grapes ought to be trod immediately, that is to say, every pannier as they bring them from the vineyard, otherwise the wine would be yellow; and this colour is disagreeable to the sight, and still more to the palate, and consequently gives the wine a bad quality.

According as the Grapes are pressed on the middle, and that the pipe fills, they empty it to fill the puncheons,

cheons, or the quarter puncheons, to a pail full, or thereabouts, according to the largeness of the cask wherein it is put; to make it boil, they fill them up to the hole of the bung with the wine which comes from the two first pressings, and that which remained in the pipe before they gave the two first squeezings, and that which the others yield, serve to put into the wine, when the first boiling begins to be diminished.

One ought always to give the marc, whether it be white or red, four pressings, without taking in the lowering of the beam, that is to say, that it ought to be cut four times.

Some give it to the third working with an iron grapple in the middle of the marc, and they leave all round about half a foot in breadth, to keep in that which is wrought, and at the fourth pressing they cut the border that they left, and put it back upon the other.

They pretend that a marc so ordered yields the more wine. As the marc of white wine is the more thick, and has less fire than the Auvernat, it does not dry so soon; for this reason there ought to be longer times between these squeezings.

They give them these commonly in the night-time, because they do not lower the beam; but when the day's work is finished, when the men who are to work the marc have supped.

When the white wine is cold, it must be filled up and bunged, and kept always full, at least if it be not in the depth of winter, for when this kind of wine is emptied, it becomes yellow in most countries; but when this happens, it is easily remedied, either by stirring it with a stick of Hazel cleft into four, which is put in at the bung-hole, or in shaking briskly the puncheon, which they leave sometimes on the bung, to the end that the lee that descends thither, and afterwards is mixed again when the cask is turned up, may take away the yellowness.

The second method seems to be the best, for besides that the wine does not take wind, it is also done in a great deal less time, for one is not obliged to unbung and bung again every cask, for they may be filled up with a small tin funnel.

For some years past they have made rapes of white wines, from which they do not reap any great advantage; they make use of them to mix with the coarse, harsh, red wines, that have but little of the quality. In the mean time, this fits the meaner sort of people, who have not a very nice taste, in that it pleases their palates, and is sold cheap.

It will not be to any purpose to name the places of this plot of vineyards, which produce the best white wines, for the merchants do not take the pains to make a distinction between the wines which have much of the quality, from others that have less; besides, they are many times deceived, for some citizens who have a great many houses of wines in different places, after the vintage is over, send that wine they have made in one lesser vintage to be added to that of another that is much better, and so a merchant thinks that all the wine he buys is from the same place, when it is not.

I do not approve of this practice of the citizens, for a merchant, who would have wine of one certain place, will not be prepared to manage that which he shall have from another, because those different wines will not produce the same effects, with the management he shall use to them, and no person ought to be deceived.

When the vintage, either of red or white wines, is finished, the press ought to be taken care of, that the rats do not gnaw the screw of it. It should be rubbed with Garlick, the smell of which those animals cannot endure; it is also good to cover it with some old casks, to hinder any filth from falling on the screw, which cannot be kept too clean.

Of vineyards in England.

There have of late years been but very few vineyards in England, tho' it appears by ancient records that they

were formerly very common, as may be gathered from the several places in divers parts of England, which yet retain that name, which testify the quantities of ground which were allotted for vineyards, to abbeyes and monasteries, for wine for the use of the inhabitants; but as to the quality of the wines which were then produced in England, we are at present ignorant; and how these vineyards were rooted up, and became so generally neglected, we have no very good accounts left. Whatever might be the cause of this total neglect in cultivating Vines in England, I will not pretend to determine, but such was the prejudice most people conceived to any attempts of producing wine in England, that for some ages past, every trial of that kind has been ridiculed by the generality of people, and at this day very few persons will believe it possible to be effected.

Indeed if we judge only by the success of some modern essays made near London, where small vineyards have been planted a few years past, there would be no great encouragement to begin a work of this kind, because the produce of very few of these vineyards has not been so kindly as were to be wished; but however, this should not deter others from making farther trials, especially when they consider the many disadvantages, which most or all of those plantations, which have been made, were attended with; for first, there is scarce one of them placed upon a proper soil and situation for this purpose; and secondly, there is not one which is rightly planted and managed, as I shall presently shew; and how can we expect success from vineyards under these disadvantages, when even in France or Italy they would succeed little better, if their management were not directed with more judgment? I shall therefore humbly offer my opinion, which is founded upon some trials I have seen made, and from the instructions that I have received from several curious persons abroad, who cultivate vineyards for their own use, and that of their friends, and who have been very exact in observing the several methods of practice amongst the vigneron of those countries, from whence it is hoped that the prejudice which most people have against a project of this kind, will either be removed, or at least suspended, until trials have been judiciously made of this affair.

The first and great things to be considered in planting vineyards is the choice of soils and situations, which, if not rightly chosen, there will be little hopes of success, for upon this the whole affair greatly depends. The best soil for a vineyard in England is such, whose surface is a light sandy loam, and not above a foot and a half or two feet deep, above the gravel or chalk, either of which bottoms are equally good for Vines; but if the soil is deep, or the bottom either clay, or a strong loam, it is by no means proper for this purpose; for although the Vines may shoot vigorously, and produce a great quantity of Grapes, yet these will be later ripe, fuller of moisture, and so consequently their juice not mature, nor well digested, but will abound with crudity, which in fermenting will render the wine sour and ill tasted, which is the common complaint of those who have made wine in England.

Nor is a very rich, light, deep soil, such as is commonly found near London, proper for this purpose; because the roots of these Vines will be enticed down too deep to receive the influences of sun and air, and hereby will take in much crude nourishment, whereby the fruit will be rendered less valuable, and be later ripe, which is of ill consequence to these fruits, which are known to imbibe a great share of their nourishment from the air, which, if replete with moisture (as is commonly the case in autumn,) must necessarily contribute greatly to render the juices less perfect, therefore great attention should be had to the nature of the soil upon which they are planted.

The next thing necessary to be considered, is the situation of the place, which, if possible, should be on the north side of a river, upon an elevation inclining to the south, with a small gradual descent, that the
moisture

moisture may the better drain off, but if the ground slopes too much, it is by no means proper for this purpose; but if, at a distance from this place, there are larger hills, which defend it from the north and north-west wind, it will be of great service, because hereby the sun's rays will be reflected with a greater force, and the cold winds being kept off, will render the situation very warm. Add to this, a chalky surface; which if those hills do abound with (as there are many such situations in England,) it will still add to the heat of the place, by reflecting a greater quantity of the sun's rays.

The country about this should be open and hilly, for if it be much planted, or low and boggy, the air will constantly be filled with moist particles, occasioned by the plentiful perspiration of the trees, or the exhalations from the adjoining marshes, whereby the fruit will be greatly prejudiced (as was before observed.) These vineyards should always be open to the east, that the morning sun may come on them to dry off the moisture of the night early, which, by lying too long upon the Vines, greatly retards the ripening of their fruit, and renders it crude and ill tasted. And since the fruit of Vines are rarely ever injured by easterly winds, there will be no reason to apprehend any danger from such a situation, the south-west, north-west, and north winds being the most injurious to vineyards in England (as indeed they are to most other fruit,) so that, if possible, they should be sheltered therefrom.

Having made choice of a soil and situation proper for this purpose, the next thing to be done is, to prepare it for planting. In doing of which the following method should be observed: in the spring it should be ploughed as deep as the surface will admit, turning the sward into the bottom of each furrow; after this it should be well harrowed, to break the clods, and cleanse it from the roots of noxious weeds, and it must be often ploughed and harrowed for at least one year, to render the surface light; and hereby it will be rendered fertile, by imbibing the nitrous particles of the air (especially if it be long exposed thereto before it is planted;) then in March the ground should be well ploughed again, and after having made the surface pretty even, the rows should be marked out from south-east to north-west, at the distance of ten feet from each other; and these rows should be crossed again at five or six feet distance, which will mark out the exact places where each plant should be placed; so that the Vines will be ten feet row from row, and five or six feet asunder in the rows, nearer than which they ought never to be planted. And herein most people who have planted vineyards have greatly erred, some having allowed no more than five feet row from row, and the plants but three feet asunder in the rows; and others, who think they have been full liberal in this article, have only planted their Vines at six feet distance every way, but neither of these have allowed a proper distance to them, as I shall shew: for in the first place, where the rows are placed too close, there will not be room for the sun and air to pass in between them to dry up the moisture, which, being detained amongst the Vines, must produce very ill effects: and, secondly, where the Vines are placed in exact squares, so near together as six feet, there can be no room for the current of air to pass between them, when their branches are extended on each side, and so consequently the damps in autumn will be entangled and detained amongst the Vines, to the great prejudice of their fruit; for since the autumns in England are often attended with rains, cold dews, or fogs, all proper care should be taken to remove every thing which may obstruct the drying up the damps which arise from the ground.

The skilful vigneron abroad are also sensible how much it contributes to the goodness of their Vines, to allow a large space between the rows; and therefore where the quality of the wine is more regarded than the quantity, there they never plant their Vines

at less than ten feet row from row, and some allow twelve. It was an observation of Bellonius, almost two hundred years since, that in those islands of the Archipelago, where the rows of Vines were placed at a great distance, the wine was much preferable to those which were close planted; and this he positively affirms to be the case, in most countries where he had travelled. Indeed we need not have recourse to antiquity for the certainty of such facts, when we are daily convinced of this truth in all close plantations of any kind of fruit, where it is constantly observed, that the fruits in such places are never so well coloured, so early ripe, nor near so well flavoured, as those produced on trees, where the air can freely circulate about them, and the rays of the sun have free access to the branches, whereby the juices are better prepared before they enter the fruit.

Having thus considered the distance which is necessary to be allowed to these plants, we come next to the planting; but in order to this, the proper sorts of Grapes should be judiciously chosen; and in this particular we have egregiously erred in England. All the vineyards at present planted here, are of the sweetest and best sort of Grapes for eating, which is contrary to the general practice of the vigneron abroad, who always observe, that such Grapes never make good wine; and therefore, from experience, make choice of those sorts of Grapes, whose juice, after fermenting, affords a noble rich liquor; which Grapes are always observed to be austere, and not by any means palatable. This is also agreeable to the constant practice of our cyder-makers in England, who always observe, that the best eating Apples make but poor cyder; whereas the more rough and austere sorts, after being pressed and fermented, afford a strong vinous liquor. And I believe it will be found true in all fruits, that where the natural heat of the sun ripens and prepares their juices, so as to render them palatable, whatever degree of heat these juices have more, either by fermentation, or from any other cause, will render them weaker and less spirituous. Of this we have many instances in fruits; for if we transplant any of our summer or autumn fruits, which ripen perfectly in England, without the assistance of art, into a climate a few degrees warmer, these fruits will be mealy and insipid; so likewise if we bake or stew any of these fruits, they will be good for little, losing all their spirit and flavour by the additional heat of the fire; and such fruits as are by no means eatable raw, are hereby rendered exquisite, which, if transplanted into a warmer climate, have, by the additional heat of the sun, been also altered so as to exceed the most delicious of our fruit in this country.

From whence it is plain, that those Grapes which are agreeable to the palate for eating, are not proper for wine; in making of which, their juices must undergo a strong fermentation; therefore since we have in England been only propagating the most palatable Grapes for eating, and neglect the other sorts, before we plant vineyards, we should take care to be provided with the proper sorts from abroad, which should be chosen according to the sort of wines intended to be imitated; though I believe the most probable sort to succeed in England is the Auvernat, or true Burgundy Grape, (which is at present very rare to be found in the English vineyards, though it is a common Grape in the gardens against walls.) This sort of Grape is most preferred in Burgundy, Champaign, Orleans, and most of the other wine countries in France; and I am informed, that it succeeds very well in several places to the north of Paris, where proper care is taken of their management; so that I should advise such persons as would try the success of vineyards in England, to procure cuttings of this Grape from those countries; but herein some person of integrity and judgment should be employed, to get them from such vineyards where no other sorts of Grapes are cultivated; which is very rare to find, unless some particular vineyards of the citizens, who are very exact to keep up the reputation of their wines, nothing

nothing being more common than for the vignerons to plant three or four sorts of Grapes in the same vineyard; and at the time of vintage to mix them all together; which renders their wines less delicate, than in such places where they have only this one sort of Grape. And here I would caution every one against mixing the juice of several Grapes together, which will cause the wine to ferment at different times, and in different manners.

The cuttings being thus provided (for I would always prefer these to layers, or rooted plants, for the reasons given at the beginning of the article Vitis) about the beginning of April is the best season for planting, when it will be proper to put the lower ends of the cuttings in water about three inches, setting them upright for six or eight hours before they are used; then at the center of every cross mark already made by a line, to the distance the Vines are designed, should be a hole made with a spade, or other instrument, about a foot deep, into each of which should be put one strong cutting, placing it a little sloping; then the hole should be filled up with earth, pressing it gently with the feet to the cutting, and raising a little hill to each about three inches, so as just to cover the uppermost eye or bud, which will prevent the wind and sun from drying any part of the cuttings, and this upper eye only will shoot; the under ones most of them will push out roots, so that this shoot will be very strong and vigorous.

After they are thus planted, they will require no other care until they shoot, except to keep the ground clear from weeds, which should be constantly observed; but as the distance between the rows of Vines is very great, so the ground between them may be sown or planted with any kind of esculent plants, which do not grow tall, provided there is proper distance left from the Vines, and care taken that the Vines are not injured by the crops, or in the gathering, and carrying them off the ground; and this husbandry may be continued three or four years, till the Vines come to bearing; after which time, there should be no sort of crop put between them in summer, because the cleaner the ground is kept between the Vines from weeds or plants, the more heat will be reflected to the Grapes; but after the Grapes are gathered, there may be a crop of Coleworts for spring use planted between the rows of Vines, and the cultivating of these will be of use to the Vines, by stirring of the ground; but as to watering, or any other trouble, there will be no occasion for it, notwithstanding what some people have directed, for in England there is no danger of their miscarrying by drought. When the cuttings begin to shoot, there should be a small stick of about three feet long stuck down by each, to which the shoot should be fastened, to prevent their breaking or lying on the ground; so that as the shoots advance, the fastening should be renewed, and all small lateral shoots (if there are any such produced) should be constantly displaced, and the ground between the Vines always kept clean. This is the whole management which is required the first summer.

But at Michaelmas, when the Vines have done shooting, they should be pruned; for if they are left unpruned till spring, their shoots being tender (especially toward their upper parts) will be in danger of suffering if the winter should prove severe.

This pruning is only to cut down the shoots to two eyes; and if, after this is done, the earth be drawn up in a hill about each plant, it will still be a greater defence against frost.

At the beginning of March the ground between the Vines should be well dug to loosen it, and render it clean; but you should be careful not to dig deep close to the Vines, lest thereby their roots should be cut or bruised, and at the same time the earth should be again laid up in a hill about each plant; but there must be care taken, not to bury the two young eyes of the former year's shoot which were left to produce new wood.

At the beginning of May, when the Vines are shooting, there should be two stakes fixed down to the side of each plant, which must be somewhat taller and stronger than those of the former year; to these the two shoots (if so many are produced) should be fastened, and all the small trailing or lateral shoots should be constantly displaced, that the other shoots may be stronger, and the ground should also be kept very clear from weeds as before.

The autumn following these Vines should be pruned again in the following manner; those of them which have produced two strong shoots of equal vigour, must be cut down to three eyes each; but in such as have one strong shoot and a weak one, the strong one must be shortened to three eyes, and the weak one to two; and such Vines as have produced but one strong shoot, should be shortened down to two eyes also, in order to obtain more wood against the succeeding year.

In the spring, about the beginning of March, the ground between the Vines should again be dug, as before, and two stakes should be placed down by the side of all such Vines as have two shoots, at such distance on each side of the plant as the shoots will admit to be fastened thereto, and the shoots should be drawn out on each side to the stakes, so as to make an angle of about forty-five degrees with the stem; but by no means should they be bent down horizontally, as is by some practised, for the branches lying too near the earth, are generally injured by the damps which arise from thence, but especially when they have fruit, which is never so well tasted, nor so early ripe upon those branches, as when they are a little more elevated.

In May, when the Vines begin to shoot, they must be carefully looked over, and all the weak dangling shoots should be rubbed off as they are produced, and those shoots which are produced from strong eyes, should be fastened to the stakes to prevent their being broken off by the wind.

This management should be repeated at least every three weeks, from the beginning of May to the end of July; by which means the shoots which are trained up for the succeeding year will not only be stronger, but also better ripened and prepared for bearing, because they will have the advantage of sun and air, which is absolutely necessary to prepare their juices; whereas if they are crowded by a number of small dangling weak branches, they will shade and exclude the rays of the sun from the other shoots; and so by detaining the moisture a longer time amongst the branches, occasion the vessels of the young wood to be of a larger dimension; and hereby the crude juice finds an easy passage through them; so that the shoots in autumn seem to be mostly pith, and are of a greenish immature nature, and wherever this is observed, it is a sure sign of a bad quality in the Vines. The soil also should be constantly kept clean, because if there are any vegetables (either weeds or plants of other kinds) growing between the Vines, it will detain the dews longer, and by their perspiration, occasion a greater moisture than would be, if the ground were entirely clear; so that those who plant other things between their rows of Vines, are guilty of a great error.

In autumn the Vines should be pruned, which season I approve of rather than the spring (for reasons before given;) and this being the third year from planting, the Vines will now be strong enough to produce fruit, therefore they must be pruned accordingly. Now suppose the two shoots of the former year, which were shortened to three eyes, have each of them produced two strong branches the summer past, then the uppermost of these shoots upon each branch should be shortened down to three good eyes (never including the lower eye, which is situate just above the former year's wood, which seldom produces any thing, except a weak dangling shoot;) and the lower shoots should be shortened down to two good eyes each, these being designed to produce vigorous shoots for the

the succeeding year, and the former are designed to bear fruit; but where the Vines are weak, and have not produced more than two or three shoots the last season, there should be but one of them left with three eyes for bearing; the other must be shortened down to two, or if weak one good eye, in order to obtain strong shoots the following summer; for there is nothing more injurious to Vines, than the leaving too much wood upon them, especially while they are young; or the overbearing them, which will weaken them so much, as not be recovered again to a good state in several years, though they should be managed with all possible skill.

In March the ground between the Vines should be well dug as before, observing not to injure their roots by digging too deep near them; but where there are small horizontal roots produced on or near the surface of the ground, they should be pruned off close to the places where they were produced; these being what the vigneron call day roots, and are by no means necessary to be left on: and after having dug the ground, the stakes should be placed down in the following manner: on each side of the Vine should be a stake put in at about sixteen inches from the foot, to which the two branches, which were pruned to three eyes, each for bearing, should be fastened, (observing, as was before directed, not to draw them down too horizontally;) then another taller stake should be placed down near the foot of the Vine, to which the two shoots which were pruned down to two eyes, should be fastened, provided they are long enough for that purpose; but if not, when their eyes begin to shoot, these must be trained upright to the stakes, to prevent their trailing on the ground, hanging over the fruit branches, or being broken by the wind.

In May the Vines should be carefully looked over again, at which time all weak lateral branches should be rubbed off as they are produced; and those shoots which shew fruit, must be fastened with basts to the stakes to prevent their being broken, until they are extended to three joints beyond the fruit, when they should be stopped; but the shoots which are designed for bearing the following season, should be trained upright to the middle stake, by which method the fruit branches will not shade these middle shoots, nor will the middle shoots shade the fruit, so that each will enjoy the benefit of sun and air.

This method should be repeated every fortnight or three weeks, from the beginning of May to the middle of July, which will always keep the shoots in their right position, whereby the leaves will not be inverted, which greatly retards the growth of the fruit; and by keeping the Vines constantly clear from horizontal shoots, the fruit will not be crowded with leaves and shaded, but will have constantly the advantage of the sun and air equally, which is of great consequence; for where the fruit is covered with these dangling shoots in the spring, and are afterwards exposed to the air, either by divesting them of their leaves, or else displacing their branches entirely, as is often practised, the fruit will become hard, and remain at a perfect stand for three weeks, and sometimes will never advance afterward, as I have several times observed; therefore there cannot be too much care taken to keep them constantly in a kindly state of growth, as the vigneron abroad well know, tho' in England it is little regarded by the generality of gardeners, who, when their Grapes suffer by this neglect, immediately complain of the climate, or the untowardness of the season, which is too often a cover for neglects of this nature. And here I cannot help taking notice of the absurd practice of those who pull off their leaves from their Vines, which are placed near the fruit, in order to let in the rays of the sun to ripen them; not considering how much they expose their fruit to the cold dews, which fall plentifully in autumn, which, being imbibed by the fruit, greatly retard them; besides no fruit will ripen so well when entirely exposed to the sun, as when they are gently screened with leaves; and by the pulling off these

leaves, which are absolutely necessary to prepare the juices before they enter the fruit, the gross parts of which are perspired away by the leaves, the fruit must either be deprived of nourishment, or else some of the gross particles will enter with the more refined parts of the juice, and thereby render the fruit worse than it would otherwise be, were the leaves permitted to remain upon the branches; for if the weak dangling shoots are constantly displaced as they are produced, the fruit will not be too much shaded by the leaves that are upon the bearing branches.

When the fruit is ripe, if the stalks of the bunches are cut half through a fortnight before they are gathered, it will cause the juice to be much better, because there will not be near so great a quantity of nourishment enter the fruit, whereby the watery particles will have time to evaporate, and the juice will be better digested. This is practised by some of the most curious vigneron in the south of France, where they make excellent wine. But if, after the fruit be cut, it is hung up in a dry room upon strings, so as not to touch each other, for a month before they are pressed, it will also add greatly to the strength of the wine, because in that time a great quantity of the watery parts of the juices will evaporate. This is a constant practice with some persons who inhabit the Tyrol, on the borders of Italy, where is made a most delicious rich wine, as hath been attested by Dr. Burnet in his travels; and I have heard the same from several gentlemen, who have travelled that road since. But with all the care that can possibly be taken, either in the culture of the Vines, or in making the wine, it will not be near so good while the vineyard is young, as it will be after it has been planted ten or twelve years; and it will be constantly mending, until it is fifty years old, as is attested by several curious persons abroad, as also by the most skilful wine-coopers at home, who can tell the produce of a young vineyard from that of an old one, after it is brought to England, by the colour of the wine. This difference is very easily accounted for from the different structure of the vessels of the plants; those of the young Vines being larger, and of a looser texture, easily admit a larger quantity of gross nourishment to pass through them; whereas those of old Vines, which are more woody, are more closely constricted, and thereby the juice is better strained in passing through them, which must consequently render it much better, though the Grapes from a young vineyard will be larger, and afford a greater quantity of juice; so that people should not be discouraged if their wines at first are not so good as they could wish, since afterward, when the vineyard is a few years older, the wine may answer their expectation. As to the fermenting and managing the wine, that is treated of particularly under the article WINES, to which the reader is desired to turn.

The vineyard being now arrived to a bearing state, should be treated after the following manner: first, in the pruning there should never be too many branches left upon a root, nor those too long; for although by doing of this, there may be a greater quantity of fruit produced, yet the juice of these will never be so good as when there is a moderate quantity which will be better nourished, and the roots of the plants not so much weakened; which is found to be of so bad consequence to vineyards, that when gentlemen abroad lett out vineyards to vigneron, there is always a clause inserted in their leases to direct how many shoots shall be left upon each Vine, and the number of eyes to which the branches must be shortened; because were not the vigneron thus tied down, they would overbear the Vines, so that in a few years they would exhaust their roots, and render them so weak as not to be recovered again in several years; and their wine would be so bad, as to bring a disreputation on the vineyard, to the great loss of the proprietor.

The number of branches which the Italians generally agree to leave upon a strong Vine are four; two of the

the strongest have four eyes, and the two weaker are shortened down to two eyes each, which is very different from the common practice in England, where it is usual to see six or eight branches left upon each root, and those perhaps left with six or eight eyes to each; so that if these are fruitful, one root must produce near four times the number of bunches which the Italians do ever permit, and so consequently the fruit will not be so well nourished, and the roots will also be greatly weakened, as is the case of all sorts of fruit-trees, when a greater number of fruit is left on than the trees can nourish.

The next thing is, constantly to keep the ground perfectly clean between the Vines, never permitting any sort of plants or weeds to grow there. The ground should also be carefully dug every spring, and every third year have some manure, which should be of different sorts, according to the nature of the ground, or which can be most conveniently procured.

If the land is stiff, and inclinable to bind on the surface, then sea-sand, or sea-coal ashes, are either of them very good manure for it; but if the ground be loose and dry, then a little lime mixed with dung is the best manure for it. This must be spread thin upon the surface of the ground before it is dug, and in digging should be buried equally in every part of the vineyard. These are much preferable to that of all dung for Vines, so that it will be worth the expence to procure either of them; and as they require manuring but every third year, where the vineyard is large, it may be divided into three equal parts, each of which may be manured in its turn, whereby the expence will be but little every year; whereas when the whole is manured together, it will add to the expence; and in many places there cannot be a sufficient quantity procured, to manure a large vineyard in one year.

This digging and manuring should always be performed about the beginning of March, at which time all the superficial or day-roots, as they are called, must be cut off, but the larger roots must not be injured by the spade, &c. therefore the ground close to the stem of the Vines must not be dug very deep. After this is done, the stakes should be placed down, one on each side the Vines, at about sixteen inches from their stems, to which the longest bearing branches should be fastened, and one stake on each side close to the stem, to which the two shorter branches should be trained upright, to furnish wood for the succeeding year.

In the summer they must be carefully looked over, as before, rubbing off all weak dangling shoots, and training the good ones to the stakes regularly, as they are produced; and those of them which have fruit should be stopped in June, about three joints beyond the bunches, but the upright shoots, which are designed for bearing the following year, must not be stopped till the middle of July, when they may be left about five feet long; for if they are stopped sooner in the year, it will cause them to shoot out many dangling branches from the sides of the eyes, which will not only occasion more trouble to displace them, but also will be injurious to the eyes or buds.

N. B. All this summer dressing should be performed with the thumb and finger, and not with knives, because the wounds made by instruments in summer do not heal so soon as when stopped by gently nipping the leading bud, which, if done before the shoot is become woody, may be effected with great ease, being very tender while young.

When a vineyard is thus carefully dressed, it will afford as much pleasure in viewing it as any plantation of trees and shrubs whatever, the rows being regular; and if the stakes are exactly placed, and the upright shoots stopped to an equal height, there is nothing in nature which will make a more beautiful appearance; and during the season that the Vines are in flower, they emit a most grateful scent, especially in the morning and evening; and when the Grapes begin to ripen, there will be a fresh pleasure arising in viewing of them.

But as the beauty of vineyards arises from the regular disposition of the branches of the Vines, great care should be taken in their management, to train them regularly, and to provide every year for new wood to bear the succeeding year; because the wood which has produced fruit is commonly cut quite away after the fruit is gathered, or at least is shortened down to two eyes, to force out shoots for the next year; where there is not a sufficient number of branches upon the Vine of those trained upright, so that in summer, when the Vines are in perfection, there should be six upright shoots trained for the next year's wood, and three or four bearing branches with fruit on them; more than these ought never to be left upon one Vine, for the reasons before given.

N. B. The *Auvernat*, or true Burgundy Grape, is valued in France before any other sort, because the fruit never grows very close upon the bunches, therefore are more equally ripened, for which reason it should also be preferred in England; though in general, those sorts are most esteemed with us that have always close bunches, which is certainly wrong; for it may be observed, that the Grapes on such bunches are commonly ripe on one side, and green on the other, which is a bad quality for such as are pressed to make wine.

I shall now subjoin a few sorts of Vines, which are preserved in some curious gardens, more for the sake of variety, than the value of their fruit: these are,

1. VITIS (*Indica*) foliis cordatis dentatis subtus villosis, cirrhis racemiferis. Flor. Zeyl. 99. Vine with heart-shaped indented leaves, which are hairy on their under side, and branching tendrils. Vitis sylvestris Indica, acinis rotundis. Raii Dend. 67. Wild Indian Vine, with round berries.
2. VITIS (*Labrusca*) foliis cordatis subtrilobis dentatis, subtus tomentosis. Lin. Sp. Plant. 203. Vine with heart-shaped indented leaves, which are almost three-lobed, and woolly on their under side. Vitis sylvestris Virginiana. C. B. P. 299. Wild Virginia Grape.
3. VITIS (*Vulpina*) foliis cordatis dentato-ferratis utrinque nudis. Lin. Sp. 203. Vine with heart-shaped, sawed, indented leaves, which are smooth on both sides. Vitis vulpina dicta Virginiana nigra. Pluk. Alm. 392. The Virginia Fox Grape.
4. VITIS (*Laciniatis*) foliis quinatis, foliolis multifidis. Hort. Cliff. 74. Vine with leaves having five lobes, and cut into many points. Vitis laciniatis foliis. Corn. Canad. 182. Vine with jagged leaves, commonly called the Parsley-leaved Grape.
5. VITIS (*Arborea*) foliis supradecompositis, foliolis lateralibus pinnatis. Lin. Sp. Plant. 203. Vine with more than compounded leaves, and lateral winged lobes. Frutex scandens petroselinii foliis, Virginiana, claviculis donatus. Pluk. Mant. 85. Climbing Virginia Shrub with Parsley leaves, sending out tendrils. Reynardsonia. Rand. Ind. Hort. Chelf. Falsely called the Peppertree.

The first sort grows naturally in both Indies. The stalks of this are woody, and send out many slender branches, which are furnished with branching tendrils, by which they fasten themselves to the neighbouring trees, and are thereby supported. The leaves are heart-shaped, indented on their edges, and hairy on their under side. The flowers are disposed in bunches like those of the other species, and are succeeded by round berries or Grapes, of an austere taste.

The second sort hath ligneous stalks which send out many branches, that fasten themselves by tendrils to any neighbouring support. The leaves of this are large, and for the most part divided into three lobes which are indented on their edges. The under side of the leaves is covered with a white down. The fruit is disposed in bunches like the other Grapes. The berries are round and black; the juice has a rough flavour.

The third sort has heart-shaped leaves which are indented on their edges, and are smooth on both sides. The plants climb on trees by the help of their tendrils, like those of the other sorts. The fruit is disposed in bunches. The berries are black, and their juice has a flavour resembling the scent of a fox, from

whence the inhabitants have given it the title of Fox Grape.

The fourth sort is supposed to grow naturally in Canada, but it has been long cultivated in the European gardens for its fruit; but as it has but little flavour, and ripens late in autumn, so it has been almost banished the English gardens, where at present there are only a few plants preserved for the sake of variety. The stalks and branches of this are like those of the common Grape, but the leaves are cut into many slender segments. The Grapes are round and white, and are disposed in loose bunches.

The fifth sort is by Dr. Linnæus ranged under this genus of *Vitis*, but the characters of this plant are not sufficiently known in Europe, to determine the proper genus to which it belongs, for the plant seldom produces flowers here, and has never produced any fruit in England, for which reason I have ranged it under the same genus, upon Dr. Linnæus's authority. The stalk of this plant is ligneous, and sends out many slender branches furnished with tendrils, which fasten themselves to any neighbouring plants for support, and are garnished with leaves composed of many smaller winged leaves, so that they are divided somewhat like those of common Parsley; they are of a lucid green on their upper side, but are much paler on their under. The flowers spring from the wings of the stalks in loose bunches; they are very small, white, and are composed of five small petals which expand, and soon fall off; these are not succeeded by any fruit in England, but the berries which I have received from America, had generally three seeds in each.

Mr. Rand gave it the title of Reynardsonia, from Mr. Reynardson of Hillendon, near Uxbridge, who was a great collector of foreign plants, but the characters of the genus were not mentioned by him.

The first sort being a native of warm countries, will not live in England without artificial heat; it is easily propagated by seeds, when they are brought from the countries where the plants grow naturally, for they do not produce any here; these must be sown in small pots, which should be plunged into a hot-bed of tanners bark. When the plants come up and are fit to remove, they should be each transplanted into a separate small pot filled with light earth, and plunged into a fresh hot-bed of tanners bark, shading them from the sun till they have taken new root; then they must be treated in the same way as other tender exotic plants from the same countries, always continuing them in the stove, otherwise they will not thrive. These plants cast off their leaves every winter. The second and third sorts grow in great plenty in the woods of America, where, I have been informed, are many other sorts, which produce fruit very little inferior to some of the fine sorts which are cultivated in Europe; notwithstanding which, it is generally thought impossible to make wine in America: this I dare say, must proceed from a want of skill, rather than any bad quality in the soil or climate; so that instead of planting vineyards on their loose rich lands (as hath been generally practised by the inhabitants of these countries) if they would plant them upon rising ground, where the bottom was rocky or hard near the surface, I dare say they would have very good success; for the great fault complained of in those countries is, that the Grapes generally burst before they are fully ripe, which must certainly be occasioned by their having too much nourishment; therefore, when they are planted on a poorer soil, this will be in part remedied. Another cause of this may proceed from the moisture of the air, (occasioned by the perspiration of trees, &c.) which being imbibed by the fruit, may break their skins. This indeed cannot be prevented, until the country is better cleared of the timber: but however, this should caution people not to plant Vines in such places where there are great quantities of wood, because of this effect, which it hath on the Grapes. But to return:

These two Vines are preserved in the gardens of those

who are curious in botany, but I have not seen either of them produce fruit in this country. They may be propagated by layers in the same manner as the common Grapes, which will take root in one year, and may be taken off, and transplanted in the spring where they are to remain, which should be against a warm wall; because if they are exposed to much cold in winter, they are often destroyed, especially while they are young.

Their pruning and management is the same with any other sorts of Grapes, but only they should have fewer shoots, and those shortened down very low; indeed the Fox Grape does not like much cutting; otherwise they will make very weak shoots the following year, and never arrive to any considerable strength, so will not be capable of producing any fruit.

The fourth sort is planted against walls; and treated in the same way as the common Vines; and may be propagated by cuttings or layers in like manner.

The fifth sort is preserved in some gardens for the sake of variety, but as it rarely produces flowers in England, so it has not much beauty; it is a native in Virginia and Carolina, from both of these countries I have received the seeds. As this sort does not produce seeds here, it is generally propagated by laying down the young branches, which will put out roots in one year fit to remove, when they may be taken off, and transplanted where they are to remain. These require support; and as their young branches are tender, and liable to be killed by frost, so if they are planted against a wall or pale, exposed to the south, they will succeed much better than when they are fully exposed to the open air, and supported by props. The young shoots of these plants should be shortened down to two or three buds in the spring, which will cause the shoots of the following summer to be much stronger, and when they are regularly trained against the wall or pale, they will produce flowers in warm seasons.

This plant is very apt to push out suckers from the root, by which it is often propagated, but the plants so raised are very subject to send out suckers again, whereby they are robbed of their nourishment, and do not thrive so well as those which come from layers.

VITIS IDÆA. See VACCINIUM.

VITIS SYLVESTRIS. See CLEMATIS.

ULEX. Lin. Gen. Plant. 786. Genista Spartium. Tourn. Inst. R. H. 645. tab. 412. Furze, Gorse, or Whins.

The CHARACTERS are,

The flower has a two-leaved empalement; it has five petals, and is of the butterfly kind. The standard is large, erect, oval, heart-shaped, and indented at the point. The wings are shorter and obtuse. The keel is composed of two obtuse petals, whose borders are joined at bottom; it has ten stamina, nine joined, and one separate, terminated by single summits, and an oblong cylindrical germen, supporting a rising style, crowned by a small obtuse stigma. The germen afterward turns to an oblong turgid pod with one cell, opening with two valves, inclosing a row of kidney-shaped seeds.

This genus of plants is ranged in the third section of Linnæus's seventeenth class, which includes those plants whose flowers have ten stamina joined in two bodies.

The SPECIES are,

1. ULEX (*Europæus*) foliis villosis acutis spinis sparsis. Lin. Sp. Plant. 741. *Ulex with acute-pointed hairy leaves, and sparsed spines. Genista spinosa major, longioribus aculeis. C. B. P. 394. The common Furze, Whins, or Gorse.*
2. ULEX (*Capensis*) foliis obtusis folitariis, spinis simplicibus terminalibus. Flor. Leyd. Prod. 372. *African Furze, or Whins, with single blunt leaves. Genista spartium bacciferum, ericæ foliis Africanum. Pluk. Alm. 166. African Berry-bearing Furze, with a leaf like Heath.*

This genus of plants has been titled by the ancient botanists *Genista spinosa*, and *Genista spartium*, but these being compound names have been rejected; and

as there is another genus of plants under the title of Genista, Dr. Linnæus has applied this title of Ulex, which is a name used by Pliny, to this genus.

The common Furze, Gorze, or Whins, as it is called in the different counties in England, is so well known as to need no description.

There are two or three varieties of this, which are frequently met with on the commons and heaths in most parts of England; but as they are not specifically different, they are not worthy to be enumerated here, especially as they are plants which are seldom cultivated.

But these have by many botanists been mentioned as specifically different, for which reason I sowed their seeds in the garden, and found all the varieties arise from the same seeds.

These plants propagate themselves very plentifully by seeds, so that when they are established in a spot of ground, they soon spread over the place; for as the seeds ripen, the pods open with the warmth of the sun, and the seeds are cast out with an elasticity to a great distance all round, and these soon vegetate; whereby the ground is filled with young plants, which are not easily destroyed, when they are well rooted in the ground.

Some years ago the seeds of this plant were sown to form hedges about fields, where, if the soil was light, the plants soon become strong enough for a fence against cattle; but as these hedges in a few years became naked at the bottom, and some of the plants frequently failed, there became gaps in the hedges, therefore the raising of them has been of late years little practised. But there are some persons who have sown the seeds of this plant upon very poor hungry gravel or sandy land, which has produced more profit than they could make of the ground by any other crop, especially in such places where fuel of all sorts is dear; for this Furze is frequently used for heating ovens, burning lime and bricks, and also for drying malt. And in some places where there has been a scarcity of fuel, I have known poor land, which would not have lett for five shillings per acre, which has been sown with Furze, produce one pound per acre per ann. so that there has been a considerable improvement made by this plant. But this is not worth practising in such countries where fuel of any kind is cheap, or upon such land as will produce good Grass or Corn; therefore it is only mentioned here to shew, that poor lands may be so managed, as to bring an annual profit to their proprietors.

The second sort is a native of the country near the Cape of Good Hope, where it usually grows to the height of five or six feet; but in Europe, where it is preserved as a curiosity in some gardens, it seldom rises so high. The stalk is ligneous and hard, covered with a greenish bark when young, but it afterward becomes grayish. The branches are slender and ligneous, the leaves are single, obtuse, and the shoots terminate with spines. This plant has been several years in the English gardens, but has not produced any flowers.

This plant is too tender to live in the open air through the winter in England, therefore it is preserved in green-houses with the hardier sorts of exotic plants, which do not require any artificial heat to preserve them.

It is very difficult to propagate either by layers or cuttings, for the layers are generally two or three years before they have sufficient root to transplant, and the cuttings do very rarely take root, and as the plant does not produce seeds in Europe, it is very rare in the European gardens. It is a plant of no great beauty, but, as it is an evergreen, it is admitted into the gardens of those who are curious in botany for the sake of variety.

ULMARIA. See SPIRÆA.

ULMUS. Tourn. Inst. R. H. 601. tab. 372. Lin. Gen. Plant. 281. The Elm-tree; in French, *Orme*.

The CHARACTERS are,

The flower has a rough permanent empalement of one leaf,

cut at the rim into five points, and coloured within; it has no petals, but has five awl-shaped stamina twice the length of the empalement, terminated by short erect summits having four furrows, and an orbicular erect germen supporting two styles which are reflexed, and crowned by hairy stigmas. The germen afterward turn to a roundish, compressed, bordered capsule, including one roundish compressed seed.

This genus of plants is ranged in the second section of Linnæus's fifth class, which contains those plants whose flowers have five stamina and two styles.

The SPECIES are,

1. ULMUS (*Campestris*) foliis oblongis acuminatis, duplicato-ferratis, basi inæqualibus. *Elm with oblong acute-pointed leaves, which are doubly sawed on their edges, and unequal at their base. Ulmus vulgarissima, folio lato, scabro. Ger. Emac. 1480. The common rough, or broad-leaved Witch Elm.*
2. ULMUS (*Scabris*) foliis oblongo-ovatis inæqualiter ferratis, calycibus foliaceis. *Elm with oblong oval leaves which are unequally sawed, and have leafy empalements to the flowers. Ulmus folio latissima, scabro. Ger. Emac. 1481. The Witch Hazel, or rough and very broad-leaved Elm; by some unskilful persons called the British Elm.*
3. ULMUS (*Sativus*) foliis ovatis acuminatis duplicato-ferratis, basi inæqualibus. *Elm with oval acute-pointed leaves which are doubly sawed, and unequal at their base. Ulmus minor, folio angusto, scabro. Ger. Emac. 1480. The small-leaved or English Elm.*
4. ULMUS (*Glabris*) foliis ovatis glabris, acutè ferratis. *Elm with oval smooth leaves, which are sharply sawed on their edges. Ulmus folio glabro. Ger. Emac. 1481. The smooth-leaved Witch Elm.*
5. ULMUS (*Hollandicus*) foliis ovatis acuminatis rugosis, inæqualiter ferratis, cortice fungoso. *Elm with oval, acute-pointed, rough leaves, which are unequally sawed, and a fungous bark. Ulmus major Hollandica, angustis & magis acuminatis samarris, folio latissimo, scabro. Pluk. Alm. The Dutch Elm.*
6. ULMUS (*Minor*) foliis oblongo-ovatis glabris acuminatis duplicato-ferratis. *Elm with oblong, smooth, acute-pointed leaves, which are doubly sawed. Ulmus minor, folio angusto, glabro. The smooth narrow-leaved Elm, by some called the upright Elm.*

The first sort is very common in the north-west counties of England, where it is generally believed to grow naturally in the woods; this grows to a very large size. The bark of the young branches is smooth and very tough, but that of the old trees cracks and is rough. The branches spread, and do not grow so erect as those of the third sort. The leaves are rough, and are doubly sawed on their edges. Their base is unequal, about three inches long and two broad, of a dark green colour, and stand upon short foot-stalks. The flowers come out in March upon the slender twigs, standing in clusters; they are of a deep red colour; these are succeeded by oval bordered capsules, containing one roundish compressed seed which ripens in May. The wood of this tree is good for all the purposes of any kind of Elm, and the trees grow to a very large size, but the leaves do not come out till late in the spring, so there are few persons who plant these trees near their habitations.

The second sort grows naturally in some of the northern counties of England, where it is frequently called Witch-hazel, from the resemblance of the young shoots and leaves to those of Hazel. This grows to a tree of great magnitude. The bark of the young shoots is very smooth and tough; it is of a yellowish brown colour, with spots of white. The leaves are oval, six inches long, and almost four broad, and are unequally sawed on their edges. The flowers grow in clusters toward the end of the twigs; they have long leafy empalements of a green colour, and appear in the spring before their leaves, and the seeds ripen the latter end of May. The wood of this tree is not so good for use as that of the first sort. Formerly, when long bows were in use, many of them were made of the boughs of this tree.

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The third sort is commonly known in the nursery-gardens by the title of English Elm, which is far from being a right appellation, for it is not a native of England, and is only found growing near London, or in plantations where the young trees were procured from the neighbourhood of London. Where this tree grows naturally is not easy to determine; some persons have supposed it was brought from Germany. As this tree is well known, it requires no description. The flowers of this are of a purplish red colour, and generally appear the beginning of March, but I could never observe any seeds upon this sort.

The fourth sort is very common in several parts of Hertfordshire, Essex, and other north-east counties of England; this grows to a large tree, and is much esteemed. The branches spread out like those of the first sort. The leaves are oval, and sharply sawed on their edges; they are smoother than most of the other sorts, and do not appear till the middle or latter end of May, so the trees are seldom planted near habitations.

The fifth sort is well known by the title of Dutch Elm; this was brought from Holland the beginning of King William's reign, and was for some time a fashionable tree, and has been recommended for its quick growth; it was some years ago in great request for forming hedges in gardens, for which purpose it was one of the most improper trees that could be chosen, for they made very strong irregular shoots, which are distant from each other. The leaves were very large and rough, and the branches covered with a fungous rough bark, which was disagreeable, so that when the hedges were sheared, they appeared naked and disagreeable the whole summer after. The wood of this tree is good for nothing, so it is almost banished this country.

The sixth sort is found growing in hedge-rows in several parts of England. The branches of this sort have a smooth grayish bark, and grow erect. The leaves are narrower, and more pointed than those of the English Elm, and are smoother; they are later in coming out in the spring than those, but continue longer in autumn; this has been by some called the Irish Elm.

There are some other varieties of this tree which are preserved in the nursery-gardens, but their difference is not remarkable enough to deserve notice, therefore they are omitted, as are also those with variegated leaves, of which there are several varieties propagated in the nurseries about London; these are by some persons esteemed.

All the sorts of Elm may be either propagated by layers or suckers taken from the roots of the old trees, the latter of which is generally practised by the nursery gardeners; but as these are often cut up with indifferent roots, they often miscarry, and render the success doubtful; whereas those which are propagated by layers are in no hazard, and always make better roots, and come on faster than the other, and do not send out suckers from their roots in such plenty, for which reason this method should be more universally practised. And since a small compass of ground filled with stools of these plants will be sufficient to furnish a nursery of a considerable extent, annually, with layers to be transplanted, it is richly worth every person's while, who would cultivate these trees, to allot a spot of ground for this purpose.

The best soil for such a nursery is a fresh Hazel loam, neither too light and dry, nor over moist and heavy; this ground should be well trenched, and if a little rotten dung is buried therein, it will be of service; in doing of this great care should be taken to pick out all the roots of pernicious weeds, which, if left in the ground, would be very injurious to the layers, and cannot afterwards be so easily rooted out; then having laid the ground level, the plants must be planted at about eight feet asunder each way. The best season for this work is in autumn, as soon as the leaves begin to decay, that they may take root before the dry weather in the spring comes on, whereby a

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great expence of watering them will be saved; for if they are well settled in the ground before the dry weather, they will require little more than to mulch their roots to keep the earth from drying.

These plants should be permitted to grow rude two years, during which time the ground between should be carefully cleaned and dug every spring, by which time they will be well rooted and have made pretty strong shoots, so that they may be laid in the ground. The manner of performing this being already described in the article LAYERS, I shall forbear repeating it in this place.

When these layers are well rooted, which will be in one year, they should be taken off, and transplanted out into a nursery, which should be upon a good soil, and well prepared, (as before for the stools.) The plants should be planted in rows about four feet asunder, and two feet distance plant from plant in the rows. This should be done in autumn, as soon as the leaves begin to decay, and if there is some mulch laid upon the surface of the ground about their roots, it will preserve them from being hurt by frost in winter, and from drying winds in spring, and thereby secure them from all hazard.

The following summer the ground between them should be constantly kept clean from weeds, and in autumn they should be pruned up, cutting off all strong lateral branches, which, if left on, would impede their upright growth; but there must be some of the smaller shoots left on to detain the sap, in order to augment the stems of the trees; for where they are pruned up too naked, they are apt to grow up too slender to support themselves, so that their heads will recline to the ground, and cause their stems to grow crooked.

In this nursery they may remain four or five years, observing constantly to dig the ground between them every spring, and to trim them as before directed, which will promote their growth, and render them strong enough to transplant out where they are to remain, in the time before mentioned.

These trees are very proper to plant in hedge-rows, upon the borders of fields, where they will thrive much better than when planted in a wood, or close plantation, and their shade will not be very injurious to whatever grows under them; but when these trees are transplanted out upon banks after this manner, the banks should be well wrought, and cleared from all other roots, otherwise the plants, being taken from a better soil, will not make much progress in these places. About Michaelmas will be a good time for this work, for the reasons before assigned; but when they are planted, there should be some stakes fixed in by them, to which they should be fastened to prevent their being displaced by the winds, and part of their heads should be taken off before they are planted, which will also be of use in preventing their being easily overturned by winds; but by no means should their leading shoot be stopped, nor the branches too closely cut off; for if there are not some shoots left on to draw and attract the sap, they will be in danger of miscarrying.

These trees are also proper to plant at a distance from a garden or building to break the violence of winds, for which purpose there is not any tree more useful, for they may be trained up in form of a hedge, keeping them cut every year, which will cause them to grow very close and handsome to the height of forty or fifty feet, and be a great protection against the fury of winds; but they should not be planted too near a garden, where fruit-trees or other plants are placed, because the roots of the Elms run superficially near the top of the ground to a great distance, and will intermix with the roots of the other trees, and deprive them of nourishment; nor should they be planted near gravel or Grass walks, which are designed to be well kept, because the roots will run into them, and send forth suckers in great plenty, which will deface the walks, and render them unsightly.

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But for large gardens, where shade is required, there is scarce any tree so proper for that purpose, being easy to remove when grown to a considerable size, so that a person who is willing to have his plantations for shade in a short time, may procure trees of near one foot circumference in their trunk, which will be in little danger of succeeding, provided they are removed with care. And these will take root, and grow very well, though not so well as young plants, which is what few other sorts of trees will do; but then they should be such trees as have been thus regularly trained up in a nursery, and have good roots, and not such as are taken out of hedge rows (as is by some practised,) which seldom rise with any tolerable roots, and consequently often miscarry; and this has been the occasion of so many plantations of these trees failing, for although some of them may live a few years, yet few of them are of long duration, and they rarely increase much in their stems, but frequently grow hollow, their heart decaying first, so that they are supported only by their bark or shell, for a few years, and the first severe winter, or very dry summer, they are generally destroyed.

But although I have said, that Elms which are trained up in a nursery may be removed with safety, at a larger size than most other trees, yet I would not have it understood, that by this I would recommend the planting of them when large, for if people would have a little patience when they plant, and never plant any of these trees which are more than four or five inches in the girth of their stems, they will in a few years become better trees than any of those which are transplanted of a much larger growth, and they will always grow to a much larger size; besides, they are much more easily removed, and do not require to be so strongly supported, nor is there much danger of the young trees miscarrying; therefore it is much more eligible to make choice of young thriving trees (but not out of a better soil than that where they are to be planted,) and never to plant any large trees, unless where a small number may be wanted for an immediate shade, and in such cases it is always proper to plant some young trees amongst the large ones, to succeed them when they fail.

In planting of these trees, great care must be taken not to bury their roots too deep, which is very injurious to them, especially if they are planted on a moist loam or clay; in which case, if the clay is near the surface, it will be the best way to raise the ground in a hill, where each tree is to be planted, which will advance their roots above the surface of the ground, so that they will not be in danger of rotting in winter with moisture.

When these trees are propagated by suckers taken from the foot of old trees, they are commonly laid into the ground in rows pretty close together in beds, where, in dry weather, they may be frequently watered to encourage their putting out roots. In these beds they are left commonly two years, by which time those that live will be rooted (though a great many of them generally die;) they then are transplanted into the nursery, and managed as hath been directed for the layers.

There are some who raise the Witch Elm from seeds, which it generally produces in great plenty, and are ripe in May; these should be sown upon a bed of fresh loamy earth, and gently covered. In dry weather they should be watered, and if the bed is shaded from the violent heat of the sun, it will be of great service to the seeds (for I always observe the plants to come up better in the shade, than when exposed to the sun.) When the plants come up, they should be carefully cleared from weeds, and after they have stood two years in the seed-bed, they will be fit to plant out into the nursery, where they must be managed as the former.

When we view many of the late plantations which have been made in parks and gardens within forty years past, at a very great expence, and observe the little progress they have made, it is enough to deter

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others from attempting to make plantations of this tree; for, as great part of the trees have been taken out of hedge rows, and from places where they have sprung up from the roots of old trees, they had but few roots, and those not furnished with fibres, so such of the trees as survived their removal have made scarce any progress; and I have seen many plantations which had been growing ten, twelve, or more years, almost totally destroyed in a severe winter, and sometimes by a very dry summer; for, as their roots had not extended far in the ground, the trees were weak, and though they kept alive, yet were not able to resist a severe frost, or a great drought; but the planters were in a hurry, and wanted immediate shade and prospect, so in order to obtain these, pursued a method in which they could never hope to have either in any degree of perfection; whereas if they had planted trees no bigger in their stems than a man's thumb, in ten or twelve years time they would have had both, with the pleasure of seeing an annual progress of their trees, at a time when their large-planted trees are decaying.

I have seen some expensive plantations of this kind, which have seemed to succeed for two or three years, by making strong shoots most part of the length of their stems, which has greatly deceived their planters, who did not doubt but their trees were out of danger, but in a few years after, they found most of their tops decay, and their hearts were rotting apace, so became hollow; and although they continued to put out lateral shoots, yet their stems never increased in size.

In some plantations made in the same place a few years after, with trees not a tenth part so large as the former, yet are now more than double the size of the large ones, and in a most thriving state, whereas the others do little more than just keep alive; therefore I advise every person, who wishes to have their trees thrive and become large, to plant them young, which may be performed for a very small sum, when compared with that of the other.

Another piece of advice may be also necessary here, which is, not to top or cut the trees, as is too much practised near London, which not only impedes their growth, but occasions their decaying soon.

UMBELL A, an umbel, is the extremity of a stalk or branch, divided into several pedicles or rays, beginning from the same point, and opened in such a manner as to form an inverted cone. When the pedicles, into which the stalk is divided, are subdivided into others of the same form, upon which the flowers or fruits are disposed, the first order is called rays, the second pedicles. That umbel which consists of pedicles only is called a simple umbel; that which is composed both of rays and pedicles is called a compound umbel.

UMBELLIFEROUS PLANTS are those whose flowers are produced in an umbel, on the top of the stalks, where they, in some manner, represent an umbrella. Of this kind are Parsneps, Carrots, Fennel, Parsley, &c.

URENA. Hort. Elth. 319. Lin. Gen. Plant. 754. Indian Mallow.

The CHARACTERS are,

It hath a malvaceous flower with a double empalement, the outer being of one leaf, slightly cut at the brim into five parts, but the inner is five-leaved, permanent, and cut to the bottom. The flower is composed of five leaves which are oblong, and blunt at their extremity, but narrow at their base, where they coalesce. In the center there are many stamina which are joined, and form a column at their base, but spread open above. It has a roundish five-cornered germen with a single style, and ten hairy reflexed stigmas. The germen changes to a pentagonal fruit which is burry, and divides into five cells, each having one angular seed.

This genus of plants is ranged in the third section of Linnaeus's sixteenth class, which includes those plants whose flowers have many stamina, which, with the style, are joined in one body.

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The SPECIES are,

1. URENA (*Lobata*) foliis angulatis. Lin. Hort. Cliff. 348. *Indian Mallow with angular leaves.* Urena Sinica Xanthii facie. Hort. Elth. 340. *Urena of China having the appearance of lesser Burdock.*
2. URENA (*Aculeata*) foliis inferioribus angulatis, superioribus trilobis quinquelobisque acutè ferratis. Urena with angular lower leaves, and the upper ones divided into three or five lobes which are sharply sawed. Alcea Indica frutescens foliis ad marginem exasperatis, bryoniæ albæ divifuris, e Sinu Bengalensi. Pluk. Phyt. tab. 5. fig. 3. *Indian shrubby Vervain Mallow from Bengal, with leaves having prickles on their edges, and divided like those of the white Briony.*

3. URENA (*Sinuata*) foliis sinuato-multifidis villosis. Flor. Zeyl. 257. *Urena with sinuated hairy leaves having many points.* Alcea Indica frutescens, foliis in lacinias variè dissectis. Pluk. Phyt. tab. 74. fig. 1. *Shrubby Indian Vervain Mallow, with leaves variously cut.*

The title of Urena was applied to this genus by Dr. Dillenius, in the Hortus Elthamensis, as the characters of the plants differ from all the genera of the malvaceous tribe, and this being a name applied to it in the Hortus Malabaricus.

The first sort grows naturally in China, and also in America; this rises with an upright stalk upward of two feet high, which become ligneous toward the autumn. It sends out a few side branches which are taper, stiff, and have a dark green bark; they are garnished with roundish angular leaves about two inches long, and two inches and a quarter broad, standing upon pretty long foot-stalks; they are of a dark green on their upper side, and are pale on their lower. The flowers come out single from the wings of the stalk, sitting close to it; they are shaped like those of the Mallow, but are small, and of a deep blush colour; these are succeeded by roundish capsules, armed with prickly hairs, divided into five cells, each containing one kidney-shaped seed. It flowers from July till winter, and the seeds ripen in succession.

The second sort grows naturally on the coast of Malabar, from whence I received the seeds: this rises with a ligneous stalk three feet high, dividing into four or five branches, which have a grayish bark; they are garnished with leaves of different forms; those on the lower part are angular, an inch and a half long, and about the same breadth; those above are cut some into three, and others have five angular obtuse lobes; they are of a dark green on their upper side, but pale on their under, and are sharply sawed on their edges, standing upon long foot-stalks. The flowers come out singly from the wings of the stalk; they are shaped like those of the other, but are larger. The petals are narrower at their base, and they have deep red bottoms. These appear in August and September, but unless the autumn proves warm, the seeds will not ripen in this country.

The seeds of the third sort came from Malabar; the stalks of this are hairy, and divide into many branches: it rises about two feet high, and is garnished with oblong leaves, divided into three obtuse lobes to the midrib. The lobes are indented in several parts; they are of a light green on both sides, and hairy. The flowers sit close to the stalks singly at the wings; they are shaped like those of the former, but are of a pale blush colour, with a deep red bottom. These appear in August and September, but unless the season proves warm, the seeds do not ripen in England.

These plants are propagated by seeds, which should be sown on a hot-bed early in the spring; and when the plants are fit to remove, they should be transplanted into pots, and plunged into a fresh hot-bed to bring them forward, and afterward they must be treated in the same manner as hath been directed for the tender sorts of Hibiscus, to which the reader is desired to turn. If the plants are brought forward in the spring, and afterward placed in the stove, or under a deep frame, they will ripen seeds the first season; but if they should not, they may be preserved

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through the winter in the stove, and will ripen their seeds the following season, after which the plants seldom continue.

- URTICA. Tourn. Inst. R. H. 534. tab. 308. Lin. Gen. Plant. 935. [so called from urere, Lat. to burn, because this plant, being touched, burns very much.] The Nettle; in French, Ortie.

The CHARACTERS are,

It has male and female flowers at remote distances, sometimes on the same, and at others on separate plants. The male flowers have an empalement composed of four roundish concave leaves; these have no empalements; they have a pitcher-shaped nectarium in the center of the flower, and four awl-shaped spreading stamina, terminated by summits with two cells. The female flowers have an oval permanent empalement with two valves; they have neither petals nor stamina, but an oval germen without any style, crowned by a hairy stigma. The germen afterward turns to an oval compressed seed, which ripens in the empalement.

This genus of plants is ranged in the fourth section of Linnæus's twenty-first class, which contains those plants which have distinct male and female flowers on the same plant, and the male flowers have four stamina.

The SPECIES are,

1. URTICA (*Dioica*) foliis oppositis cordatis, racemis geminis. Lin. Sp. Plant. 984. *Nettle with heart-shaped leaves which are placed opposite, and double spikes of flowers.* Urtica urens maxima. C. B. P. 232. *The greatest stinging Nettle.*
2. URTICA (*Urens*) foliis oppositis ovalibus. Lin. Sp. Plant. 984. *Nettle with oval leaves which are placed opposite.* Urtica urens minor. C. B. P. 232. *Smaller stinging Nettle.*
3. URTICA (*Pilulifera*) foliis oppositis cordatis, amentis fructiferis globosis. Lin. Sp. 1395. *Nettle with heart-shaped leaves placed opposite, and seeds in globular katkins.* Urtica urens pilulas ferens. f. Dioscoridis, semine lini. C. B. P. 232. *Stinging Nettle bearing pills and seeds like Flax, commonly called Roman Nettle.*
4. URTICA (*Dodartii*) foliis oppositis ovatis subintegerimis, amentis fructiferis globosis. Lin. Sp. 1395. *Nettle with oval leaves which are almost entire, placed opposite, and globular seed-bearing katkins.* Urtica altera, pilulifera, parietariæ foliis. Aët. Par. 131. *Another pill-bearing Nettle with a leaf like Pellitory, commonly called Spanish Marjoram.*
5. URTICA (*Cannabina*) foliis oppositis tripartitis incis. Hort. Upsal. 282. *Nettle with leaves placed opposite, which are cut into three parts.* Urtica foliis profundè laciniatis, semine lini. Amman. Ruth. 249. *Nettle with leaves which are deeply cut, and seeds like Flax.*
6. URTICA (*Cylindrica*) foliis oppositis oblongis, amentis cylindricis folitariis indivisis. Lin. Sp. Plant. 984. *Nettle with oblong leaves which are placed opposite, and single, cylindrical, undivided katkins.* Urtica foliis oblongis serratis nervosis petiolatis. Flor. Virg. 187. *Nettle with oblong, sawed, veined leaves, growing upon foot-stalks.*
7. URTICA (*Mariana*) foliis oppositis ovato-lanceolatis acuminatis crenatis, amentis cylindricis indivisis. *Nettle with oval, spear-shaped, acute-pointed, crenated leaves, which are placed opposite, and cylindrical undivided katkins.* Urtica minor iners Mariana, feminibus ex alis foliorum racemosis non ramosis. Pluk. Mant. 190. *Smaller Nettle of Maryland, with seeds growing in long bunches from the wings of the leaves, but not branched.*
8. URTICA (*Canadensis*) foliis alternis cordato-ovatis, amentis racemosis distichis erectis. Hort. Cliff. 441. *Nettle with oval heart-shaped leaves which are placed alternate, and erect, branching, double katkins.* Urtica maxima, racemosa Canadensis. H. R. Par. *Greatest branching Nettle of Canada.*
9. URTICA (*Nivea*) foliis alternis orbiculato utrinque acutis subtus tomentosis. Hort. Cliff. 441. *Nettle with orbicular leaves pointed at both ends, placed opposite, and woolly on their under side.* Urtica racemifera maxima finarum, foliis subtus argenteâ lanugine villosis. Pluk. Amalth. 212. *Greatest branching China Nettle whose*

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whose leaves are covered with a silvery hairy down on their under side.

10. *URTICA* (*Balearica*) foliis oppositis cordatis serratis, amentis fructiferis globosis. Lin. Sp. 1395. *Nettle with heart-shaped sawed leaves placed opposite, and globular katkins and fruit.* *Urtica pilulifera*, folio angustiori, caule viridi Balearica. Boerh. Ind. alt. 11. 106. *Narrow-leaved pill-bearing Nettle, of the Balearic Islands, with a green stalk.*

The first of these sorts is a very common weed upon the sides of banks, ditches, and other uncultivated places, where its roots will spread, and over-run the grounds, so that it should always be carefully extirpated from gardens; it is sometimes used in medicine, but may be easily procured from the fields at almost any season.

The second sort is also a very common weed in gardens, and in cultivated fields; but it being an annual plant, is not so difficult to eradicate as the former.

These plants are so well known as to need no description.

The third sort grows naturally in Romney Marsh, and near Yarmouth; this is an annual plant which rises near three feet high. The stalk is herbaceous, thick, of a purplish colour, and armed in every part with stinging hairs. The branches come out opposite. The leaves are heart-shaped, the lower ones are three inches long, and two broad toward their base, and end in acute points; they are deeply sawed on their edges, and stand opposite upon long foot-stalks; these are also armed with stinging hairs on both sides. The male and female flowers come out from the wings of the leaves at the same joint, on each side the stalk; the male standing above the female, upon long slender foot-stalks or katkins, placed very loosely. The female flowers have shorter foot-stalks, and are in globular heads; these are succeeded by smooth shining seeds like those of the Flax. It flowers in July and August, and the seeds ripen in autumn.

The tenth sort grows naturally in the Balearic Islands. This was discovered by Mr. Salvadore, an apothecary in Barcelona, who sent the seeds to many botanic gardens, where the plants have been cultivated several years; this differs from the third sort in having narrower leaves and globular katkins, but being somewhat like it, is not often distinguished from it.

The fourth sort grows naturally in Spain and Italy; this is also an annual plant, whose stalks are much slenderer than those of the former, and seldom branch. The leaves are placed by pairs, upon very slender foot-stalks; they are oval, spear-shaped, and for the most part entire, and have male and female flowers springing from the wings of the leaves, which are shaped like the former, the whole plant being armed with stinging hairs. This flowers and perfects its seeds at the same time as the other.

These plants may be easily propagated by sowing their seeds in March, upon a bed of light rich earth, and when the plants are come up, they should be transplanted out into beds, or the borders of the pleasure-garden, interspersing them amongst other plants, that they may not be easily discovered by persons whom there is a design to deceive, by gathering a sprig for them to smell to. After the plants have taken root, they will require no farther care but only to keep them clear from weeds. In July they will flower, and their seeds will ripen in autumn, which, if permitted to shed upon the ground, will come up the following spring, and flourish without farther care.

The seeds of the third sort are sometimes used in medicine.

The fifth sort grows naturally in Tartary, from whence the seeds were brought to the Imperial Garden at Petersburg, and have since been dispersed to most parts of Europe; this has a perennial root, from which springs up many square stalks which rise five or six feet high, garnished with oblong leaves deeply cut into three lobes, which are acutely indented on their edges; these stand opposite upon long foot-stalks. The flowers are produced from the wings of the leaves

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in long cylindrical katkins; the male are produced on the lower part of the stalk, and the female on the upper; the latter are succeeded by seeds like those of Flax, inclosed in the three-cornered empalement of the flower. This flowers in July, and the seeds ripen in autumn. The stalks and leaves of this sort are armed with stinging hairs.

This plant is easily propagated either by seeds or parting of the roots, and will thrive in most soils or situations.

The sixth sort grows naturally in Canada, and other parts of North America; it is an annual plant, with a lucid herbaceous stalk, which divides into several branches, garnished with oblong sawed leaves, having three longitudinal veins; they are placed opposite upon pretty long foot-stalks. The flowers are produced from the wings of the stalks in single katkins, which are not divided; they appear late in the year, and unless the autumn is very favourable, the seeds will not ripen in England.

The seventh sort grows naturally in North America; this has a perennial root, from which spring out many stalks from two to three feet high, garnished with oval spear-shaped leaves placed opposite, standing upon long foot-stalks; they are crenated on their edges, and end in acute points. The flowers come out from the wings of the leaves on every side the stalk, in long, cylindrical, undivided katkins; these appear in August, but the seeds do not ripen in England.

The eighth sort grows naturally in Canada and Virginia. The root is perennial; the stalks rise two feet high; the leaves are oval, heart-shaped, and stand alternately upon the stalks; the flowers come out in branching katkins from the wings of the stalks; these appear toward autumn, but are seldom succeeded by seeds in this country.

The two last sorts are common in many English gardens, where they are preserved more for the sake of variety than for any beauty. They may be propagated by parting their roots in the spring, and planted in almost any soil or situation, and will endure the severest cold of this climate in the open air.

The ninth sort grows naturally in China, where it is titled *Peama*; this is a perennial plant, sending up many stalks from the root, which rise three or four feet high, garnished with oval leaves drawing to points at both ends; they are four inches long, and two inches and a half broad, sawed on their edges, of a deep green on their upper side, but very white on their under, and have five longitudinal veins; they are placed alternately, and stand upon very long slender foot-stalks. The flowers spring from the wings of the stalk in loose katkins; these are not succeeded by seeds in England.

This may also be propagated by parting of the roots, which should be done in May, for at that season this plant is in its least vigour, the winter being the time when it is most flourishing.

The plants must be planted in pots filled with light earth, and as they are too tender to thrive in the open air in England, so they should be kept in pots, and housed in winter, and only exposed to the open air for three months in the heat of summer.

UVA URSI. See *ARBUTUS*.

VULNERARIA. See *ANTHYLLIS*.

UVULARIA. Lin. Gen. Plant. 373.

The CHARACTERS are,

The flower has no empalement; it has six oblong, erect, spear-shaped petals, and six awl-shaped stamina terminated by oblong, erect, four-cornered summits; it has an oblong, obtuse, three-cornered germen, supporting a style longer than the stamina, crowned by a triple, obtuse, spreading stigma. The germen afterward turns to an oblong obtuse capsule with three lobes and as many cells, filled with flat orbicular seeds ranged in a double order.

This genus of plants is ranged in the first section of Linnæus's sixth class, which includes those plants whose flowers have six stamina and one style.

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The SPECIES are,

1. UVULARIA (*Amplexicaule*) foliis amplexicaulibus. Lin. Sp. Plant. 304. *Uvularia with leaves embracing the stalk.* Uvularia foliis cordato-oblongis. Flor. Leyd. 29. *Uvularia with oblong heart-shaped leaves.*

2. UVULARIA (*Perfoliata*) foliis perfoliatis. Amoen. Acad. 2. p. 3. *Uvularia with perfoliate leaves.* Polygonatum ramosum; flore luteo majus. Cornut Canad. 38. *Branching Solomon's Seal, with a large yellow flower.*

The first sort grows naturally in Bohemia and Saxony. The root is perennial, but the stalk is annual; it rises about two feet high, sending out one or two branches from the lower part; it is garnished with oblong smooth leaves ending in acute points, whose leaves embrace the stalks. The flowers come out singly from the bosom of the leaves upon long slender foot-stalks; they are composed of six oblong naked petals of a yellow colour; these hang downward; they appear the latter end of April, but are rarely succeeded by seeds here.

The second sort grows naturally in North America; this has a perennial root and an annual stalk. The root is composed of many thick fleshy fibres, from which spring up several stalks, which for the most part divide into two at a small height from the ground; these spread asunder, and are garnished

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with oblong, smooth, pointed leaves, which are broad at their base, surrounding the stalk in such a manner, as if the stalk run through them. The flowers are composed of six oblong yellow petals ending in acute points; they stand upon slender foot-stalks which arise from the bosom of the leaves, and hang downward. The flowers appear about the same time with the former, but are not succeeded by seeds in England.

These plants were first ranged in the genus of Polygonatum, and by Dr. Boerhaave they were placed with the Fritillaria; but this title of Uvularia was given to it by Dr. Linnæus, from the resemblance which the fruit of it has to the Uvula.

They are both very hardy plants, so will live in the full ground, but as the flowers have not much beauty, they are only cultivated for the sake of variety; they are propagated by parting of their roots. The best season for removing them is about Michaelmas, when their roots may be separated, and planted in the borders of the flower-garden; but this should be done every third year, for if they are often removed, the plants will not thrive so well, or flower so strong, as when they stand two or three years unremoved; they delight in a soil not too wet or stiff, but a gentle hazel loam.

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WACHENDORFIA. Burman.

The CHARACTERS are,

The (*spatka*) or sheath of the flower is bivalve; the flower hath six oblong petals, the three upper ones are erect, and the three under spread open; it hath two bristly nectariums placed on each side the upper petals, and three slender declining stamina which are shorter than the petals, terminated by incumbent summits. The germen which is situated above, is roundish and three-cornered, supporting a slender declining style, crowned by a simple stigma. The germen becomes an oval capsule, having three obtuse angles, divided into three cells, each containing one hairy seed.

The title of this genus was given to it by Dr. John Burman, professor of botany at Amsterdam, in honour of Dr. Everard Jacob Wachendorf, professor of physic, botany, and chemistry at Utrecht.

This genus of plants is ranged in the first section of Linnæus's third class, the flower having three stamina and one style.

The SPECIES are,

1. WACHENDORFIA (*Thyrseflora*) scapo simplici. Lin. Sp. Plant. 59. *Wachendorfia with a single stalk bearing flowers in a thyrse.* Wachendorfia foliis lanceolatis quinquenerviis canaliculo-plicatis, floribus in thyrsum collectis. Burman. Monogr. 2. f. 2.
2. WACHENDORFIA (*Paniculata*) scapo polystachyo. Lin. Sp. Plant. 59. *Wachendorfia with a divided stalk, bearing flowers in panicles.* Wachendorfia foliis ensiformibus trinerviis, floribus paniculatis. Burm. Monogr. 4. f. 1. *Wachendorfia with sword-shaped leaves having three veins, and flowers in panicles.*

The first sort grows naturally at the Cape of Good Hope; it has a thick, tuberous, Reed-like root, of a deep red colour, sending out many perpendicular fibres of the same colour, and spreading into several

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offsets. The leaves which rise immediately from the root are large, spear-shaped, and channelled; they have five plaited veins, and resemble the folds in fans. The largest of these leaves are two feet long, and three inches broad, and of a deep green colour. The flower-stalk rises from the center of the heads between the leaves, to the height of three or four feet, and is garnished with leaves of the same form with those below, but are narrower, and are ranged alternately, embracing the stalk half round with their base. The flowers, when young, are inclosed in sheaths, which, after some time, open and make way for the flowers to come out; then they wither and dry, but remain upon the stalk like those of the yellow Asphodel. The flowers are produced from the wings of the stalk, forming a loose spike at the top; there are several flowers sustained upon one common foot-stalk which open after each other, so that there is seldom more than one open at the same time upon the same foot-stalk. The upper flowers stand almost upright, but the lower nod downward; they are hairy, and of a Saffron colour on the outside, but smooth and yellow within, having generally six petals, but sometimes the lower one is wanting; but then the place is occupied by the pointal, which is a singular sport of nature. After the flower fades, the germen swells to an almost oval, three-cornered, blunt capsule with three cells, each containing three purple hairy seeds, fixed to an oblong placenta.

This plant is propagated by offsets, which are sent out from the main head, after the same manner as some of the Flag-leaved Irises. These offsets should be taken off the latter end of August, or the beginning of September, which is the time when the roots are in the most inactive state; these must be planted

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in pots filled with soft loamy earth mixed with a little sea sand, and if the season proves hot and dry, it will be proper to place the pots where they may have only the morning sun, until the offsets have put out new roots, for when they are exposed to the full sun, the earth will dry too fast, and if the roots are much watered, they are apt to rot; after they have taken new root, they may be placed in a sheltered situation, where they may enjoy the full sun. In this place they may remain till there is danger of frosty mornings; then the pots should be placed in a hot-bed frame, with the *Ixias*, and other bulbous and tuberose-rooted plants from the Cape of Good Hope, and treated in the same manner as hath been directed for them.

The second sort is also a native of the same country with the first, but is of smaller growth; the root is in shape like that of the former, sending out several plaited leaves about six inches long, having three deep longitudinal veins in each; in the center of the leaves the flower-stalk arises, which is a foot high, sending out one or two side branches; the lower part of the stalk is of a purple colour, the upper is green and hairy; the foot-stalks of the flowers come out at the joints of the stalk, sustaining two or three flowers of a pale purple colour. These appear in the beginning of August, and are succeeded by capsules, but the seeds rarely ripen in England.

This sort requires the same culture as the former, and is equally hardy.

W A L K S are made either of gravel, sand, or Grass; these three sorts of Walks are the most common in England, but where gravel or sand cannot be procured, they are sometimes laid with powdered coal, sea-coal ashes, and sometimes of powdered brick, but these are rarely used, when either gravel or sand can be procured; however, where sea-coal ashes can be had, it is preferable to the powdered coal or bricks, because they bind very hard, and never stick to the feet in frosty weather, which is a good quality; but the darkness of its colour has been an objection to the use of it in gardens, however, for the wilderness Walks I think it is preferable to most other materials; but I shall proceed to give directions for the making of the several sorts of Walks, and first of the gravel Walks. In order to the laying of Walks in gardens, when they are marked out, the earth should be taken away to a certain depth, that the bottom of them be filled with some lime rubbish, or coarse gravel, flint-stones, or other rocky materials, which will be serviceable to prevent weeds from growing through the gravel, and also to keep away worm-casts. This bottom should be laid ten inches or a foot thick, over which the coat of gravel should be six or eight inches, which gravel should be very fine, but yet not screened, because that spoils it. This should be laid on a heap, rounding, that the larger rough stones may run down on the sides, which being every now and then raked off, the gravel by that means will be sufficiently fine.

After the gravel has been laid to the thickness above-mentioned, then the Walks must be exactly levelled, and raked true from all great drips, as well as little holes. By this means most of the stones of the Walks will be raked under your feet, which should rather be gently sprinkled back again, over the last length that is raked, then buried (as is the practice of many gardeners;) by this means the Walk will lie much harder, and the coarsest stones will very much contribute to its firmness.

There is also a great fault committed frequently, in laying Walks too round, and some to that degree, that they cannot be walked on with that ease and pleasure that ought to be; and besides, this too great rounding takes off much from the seeming breadth and beauty of the Walk.

The common allowance for a gravel Walk of five feet breadth, is an inch rise in the crown; so that if a Walk be twenty feet wide, according to this proportion, it will be four inches higher in the middle than on each side; and a Walk of twenty-five feet will be five inches, one of twenty feet four inches, and so on.

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When a Walk has been thus carefully laid, trodden down, and raked, or rather, after every length or part of it (which commonly is about fifteen feet each,) then it should be rolled well, both in length and also cross-ways. The person who rolls it should wear shoes with flat heels, that he may not make holes in the Walks, for when these are once made in a new Walk, it will not be easy to roll them out again.

In order to lay gravel Walks firm, it will be necessary to give them three or four water rollings, that is, they must be rolled when it rains so very fast, that the Walks swim with water; this will cause the gravel to bind, so that when the Walks come to be dry, they will be as hard as terrace.

Iron-mould gravel is accounted the best for binding, or gravel with a little binding loam amongst it; which latter, though it be apt to stick to the heels of shoes in hot wet weather, yet nothing binds better in dry weather.

When the gravel is over-sandy or sharp, loam is frequently mixed with it, which, if they be cast together in heaps, and well mixed, will bind like a rock; whereas, loose gravel is as uncomfortable and uneasy to walk on, as any other fault in a Walk can render it.

The best gravel for Walks is such as abounds with smooth pebbles (as is that dug at Black-heath,) which, being mixed with a due proportion of loam, will bind like a rock, and is never injured by wet or dry weather, and the pebbles being smooth, are not liable to be turned up, and loosened by the feet in walking, as are those which are angular and rough; for where Walks are laid with such gravel as is full of irregular stones, they appear unsightly in a day's time after rolling, because the stones will rise upon the surface whenever they are walked upon, but the smooth pebbles will remain handsome two or three days without rolling.

Gravel Walks are not only very necessary near the house, but there should always be one carried quite round the garden, because, being soon dry after rain, they are proper for walking on in all seasons; but then these should be but few, and those adjoining to the house ought to be large and magnificent, proportionable to the grandeur of the house and garden. The principal of these walks should be elevated, and carried parallel with the house, so as to form a terrace; this should extend itself each way, in proportion to the width of the garden, so that from this there may be a communication with the side Walks, without going on the Grass, that there may be a dry Walk continued quite through the gardens; but there is not a more ridiculous sight, than that of a strait gravel Walk, leading to the front of the house, intersecting the Grass, so as to make it appear like the stiff formal Grass plats frequently made in little court-yards by persons of low taste.

Grass Walks in gardens were formerly in great esteem, and looked upon as necessary ornaments to a garden, but of late years they have justly been banished by every person of true taste; for those narrow slips of Grass were very unsightly, and far from being ornamental, and for the most part useless, being generally too damp for persons of tender constitutions to walk upon; and whenever they were constantly used, they became bare in the places frequently trodden, so were rendered more unsightly; and as the intention of Walks in gardens is to have at all seasons a dry communication throughout the garden, for exercise and recreation, Grass Walks were very improper, because every shower of rain made them so wet, as not to be fit for use a considerable time, and the dews rendered them too damp for use either in the morning or evening; and if the Grass of Walks is not very fine and short, like that of the downs, it will be very troublesome to walk upon; besides, whenever the ground is so dry, as that persons may with safety walk upon Grass, the lawns and other parts of verdure in gardens are better adapted for use than any of those formal stiff Walks, which were so much esteemed in the last age.

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Having given directions for the making of gravel Walks, I shall come next to treat of sand Walks, which are now very frequently made in gardens, as being less expensive in the making, and also in keeping, than the former; and in very large irregular gardens, which are such as most persons esteem, this is a very great article; for as the greatest part of the Walks which are made in gardens are carried about in an irregular manner, it would be very difficult to keep them handsome, if they were laid with gravel, especially where they are shaded by trees; for the dripping of the water from their branches, in hard rains, is apt to wash the gravel in holes, and render the Walks very unsightly; and when these wood Walks are of Grass, they do not appear lightly, nor are they very proper for walking on; for after rain they continue so long damp as to render them unfit for use, and the Grass generally grows spiry and weak for want of air, and by the continual dropping of the trees, will by degrees be destroyed; therefore it is much better to lay these Walks with sand, which will be dry and wholesome; and whenever they appear mossy, or any weeds begin to grow on them, if they are scuffled over with a Dutch hoe in dry weather, and then raked smooth, it will destroy the weeds and Moss, and make the Walks appear as fresh and handsome as if they had been new laid.

In the modern way of laying out gardens, the Walks are carried through woods and plantations, so that these are shady and convenient for walking in the middle of the day. These are usually carried about, winding as much as the ground will admit of, so as to leave a sufficient thickness of wood to make the Walks private; and that the persons who are walking in one part of them, may not be seen by those who are in any of the other parts. Where these Walks are contrived with judgment, a small extent of ground will admit of a great many turns, so that a person may walk some miles in a small garden. But these turns should be made as natural as possible, so as not to appear too much like a work of art, which will never please so long as the former.

The breadth of these Walks should be proportioned to the size of the ground, which in a large extent may be twelve or fourteen feet wide, but in small gardens five or six feet will be sufficient. There are some persons who allow a much greater breadth to their Walks than what I have assigned to the largest gardens, but as these walks are supposed to be shaded by trees, so when they are made too broad, the trees must be planted close to the sides of the Walks; and then it will be a long time before they will afford a sufficient shade, if the trees are young. Therefore I imagine, the width here allowed will by most people be thought sufficient, especially as the walks are designed to wind as much as the ground will allow, because the wider they are, the greater must be the turns, otherwise the Walks will not be private for any small distance. Besides, as it will be proper to line the sides of these Walks with Honeysuckles, Sweetbriar, Roses, and many other sweet flowering shrubs, so the tall trees should be placed at least five or six feet from the Walk, to allow room for these. But as I shall particularly treat of the method of laying out wildernesses, and planting of them, in such a manner as to render them as nearly resembling a natural wood as possible, under its proper head, I shall add nothing more in this place, except a few common directions for making of these sand Walks.

When the ground is traced out in the manner as the Walks are designed, the earth should be taken out of the Walks, and laid in the quarters. The depth of this must be proportioned to the nature of the soil; for where the ground is dry, the Walks need not be elevated much above the quarters, so the earth should be taken out four or five inches deep in such places; but where the ground is wet, the bottom of the Walks need not be more than two inches below the surface, that the Walks may be raised so high as to

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throw off the wet into the quarters, which will render them more dry and healthy to walk on.

After the earth is taken out to the intended depth, the bottom of the Walks should be laid with rubbish, coarse gravel, or whatever of the like nature can be most readily procured. This should be laid four, five, or six inches thick, and beaten down as close as possible, to prevent the worms from working through it; then the sand should be laid upon this about three or four inches thick, and after treading it down as close as possible, it should be raked over, to level and smooth the surface. In doing of this, the whole should be laid a little rounding to throw off the wet, but there will be no necessity of observing any exactness therein; for as the whole ground is to have as little appearance of art as possible, the rounding of these Walks should be as natural, and only so contrived, as that the water may have free passage from them.

The sand with which these Walks are laid, should be such as will bind, otherwise it will be very troublesome to walk on them in dry weather; for if the sand be of a loose nature, it will be moved with strong gales of wind, and in dry weather will slide from under the feet. If after these Walks are laid, they are well rolled two or three times, it will settle them, and cause them to be firm. If the sand is too much inclinable to loam, it will also be attended with as ill consequence as that which is too loose, for this will stick to the feet after every rain; so that where sand can be obtained of a middle nature, it should always be preferred.

In some countries where sand cannot be easily procured, these Walks may be laid with sea shells well pounded, so as to reduce them to a powder, which will bind extremely well, provided they are rolled now and then; but where neither of these can be easily procured, sea-coal ashes, or whatever else can be gotten, which will bind, and will be dry to the feet, may be used for this purpose; and where any of these can only be had in small quantities, the walks should have a greater share of rubbish laid in their bottom, and these spread thinly over them; and in most places rubbish, rough stones, or coarse gravel, may be easily procured.

W A L L S are absolutely necessary in gardens, for the ripening of all such fruits as are too delicate to be perfected in this country without such assistance. These are built with different materials; in some countries they are built of stone, in others with brick, according as the materials can be procured best and cheapest.

Of all materials proper for building Walls for fruit-trees, brick is the best; in that it is not only the handsomest, but the warmest and kindest for the ripening of fruit; besides that, it affords the best convenience of nailing, for smaller nails will serve in them than in stone Walls, where the joints are larger; and brick Walls, with copings of free-stone, and stone pilasters or columns, at proper distances, to separate the trees and break off the force of the winds, make not only the most beautiful, but the most profitable Walls.

In some parts of England there are Walls built both of brick and stone, which have been very commodious. The bricks of some places are not of themselves substantial enough for Walls, nor are they any where so durable as stone; and therefore some persons, that they might have Walls both substantial and handsome, have built double ones, the outside being of stone, and the inside of brick, or a stone Wall lined with brick; but when these are built, there must be great care taken to bind the bricks well into the stone, otherwise they are very apt to separate one from the other, especially when frost comes after much wet, which swells the mortar, and frequently throws down the bricks, when the Walls are only faced with them, and not well tied into the stone.

Where the Walls are built entirely of stone, there should be trellises fixed up against them, for the more

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convenient fastening the branches of the trees: the timbers of these espaliers need not be more than an inch and a half thick, and about two inches and a half broad; these should be fixed cross each other, at about four inches distance; for if they are at a much greater distance, it will be difficult to fasten the shoots of the trees properly. As this trellis will be laid close to the wall, the branches of the trees will lie about two inches from the wall, in which position the fruit will ripen better than when it lies quite close to the wall; so that where stone Walls are built, there should always be these espaliers framed against them, which will render these Walls very good for fruit trees, which, without the espaliers, seldom are found to answer the purpose of ripening the fruits well, besides the inconvenience of having no good fastening for the branches of the trees.

There have been several trials made of Walls built in different forms; some of them having been built semicircular, others in angles of various forms, and projecting more towards the north, to screen off the cold winds; but there has not been any method as yet which has succeeded near so well, as that of making the Walls straight, and building them upright.

The fairest trial which I have seen made of circular Walls, was at Goodwood in Sussex, the seat of the Duke of Richmond, where, in the middle of two south Walls, there were two large segments of circles, in which were the same sorts of fruit-trees planted, as against the straight parts of the Walls; but there never was any fruit upon the trees in the circular part of the Walls, which came to maturity; nor were the trees of long continuance, being blighted every spring, and in a few years were totally destroyed; and when the branches of those trees which grew upon the straight parts of the Walls, had extended themselves so far, as to admit of their being led into the circular parts of the Walls, they were constantly blighted and killed.

When the trees which had been planted in the circular parts were destroyed, the Walls were filled with Vines; but the Grapes of the same sort were a full month later than those growing against the straight parts of the Walls, so that they rarely ripened, which occasioned their being rooted out, and Figs were afterwards planted, but the fruit of these succeeded little better; nor can it be supposed that any trees or plants will thrive so well in these circles, where there is a constant draught of air round them, which renders the situation much colder than the open free air.

I have also seen at Mr. Le Cour's garden in Holland, some Walls built in angles of different forms, but these succeeded no better than the circles before-mentioned; for I did not find one tree in health against the Walls, nor did they produce fruit.

There are several other schemes which have been proposed by different persons, for the building of Walls to accelerate the ripening of fruits, among which there was a very ingenious book written some years ago, intitled, *Fruit Walls improved*, by inclining them to the horizon; in which the author has shewn by calculation that there will be a much greater number of the rays of the sun fall upon such Walls, than upon those which are built perpendicular; and from thence he has drawn calculations, that Walls so built will be of great service in the accelerating of fruit; and he has taken the trouble of calculating the different inclinations which such Walls should have in the different climates, in order to receive the greatest number of the sun's rays. This theory seems to have all the demonstration necessary for its support, but upon trial they have not succeeded in the least; for as these Walls must be built against banks of earth, the damps which arise from the ground overbalance the advantage of the sun's rays; besides, these sloping Walls being more exposed to the cold dews in the night, the fruit will be much more chilled thereby; and in the spring the morning frosts will prove much more destructive to the tender blossoms of the fruit-trees, as they will be more exposed to them, than against an upright Wall;

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add to this, their being much more exposed to the winds and the rain; and it will be found, by comparing the advantages proposed from these Walls, with the disadvantages to which the fruit-trees will be exposed, that upright Walls will have the preference; for it is not the strongest rays of the sun in the heat of summer, which are so much wanting for ripening of fruit, as the continuance of a moderate share of warmth; and above all, the having of the sun in a morning, to dry off the cold dews of the night early, is of the greatest use; and in this respect the upright Walls are much preferable to the sloping, as they will have the direct rays of the sun in the morning, which will be oblique on the other, and renders those Walls which are built inclining to the east preferable to south Walls, as the fruit will always ripen earlier against them.

There are some persons who recommend the painting of Walls black, or of a dark colour, as they suppose the dark colour will imbibe more of the sun's rays, so will retain the warmth longer; this also answers better in theory than in practice; for although it must be allowed that a black Wall is warmer to the touch than a common brick wall, yet, as the fruit generally is situated at a small distance from the Wall, it receives no benefit from the warmth of the Wall, and it is the reflected heat which accelerates the ripening of fruit; therefore I would advise every one to make fair trials of these things, before they put them in practice, and not to take upon trust what they may be told by persons who are too sanguine in recommending to others schemes which they have adopted upon very slight principles, or perhaps upon a single trial; this painting of the Walls is recommended by the same person who wrote upon inclining Walls, and he has proposed this upon the same principles; but the introducing of these schemes should be avoided, until there have been sufficient trials made to warrant their use.

Where persons are willing to be at the expence, in the building of their Walls substantial, they will find it answer much better than those which are slightly built, not only in their duration, but also in their warmth; therefore a Wall two bricks thick, will be found to answer better than one brick and a half; and if in the building of garden Walls they are grouted with soft mortar, to fill and close all the joints, the Walls will be much stronger, and the air will not so easily penetrate through them, as it does through those which are built in the common way.

According to the modern taste in gardening, there are very few Walls built round gardens; which is certainly very right, not only with regard to the pleasure of viewing the neighbouring country from the garden, but also in regard to the expence, 1. Of building these Walls; 2. If they are planted with fruit, as is frequently practised, to maintain them will be a constant charge, without receiving much profit or pleasure; for when there is too much Walling planted with fruit-trees, they are seldom taken much care of; so that the quantity of fruit produced will be small, and that ill-nourished and bad tasted, therefore the quantity of Walling should be proportioned to the fruit consumed in the family; but as it will be necessary to inclose the kitchen-garden for the security of the garden-stuff, so if that be walled round, it will contain as much fruit as will usually be wanted in the family; because the kitchen-garden is always proportioned to the number of persons maintained; but if the quantity of Walling which surrounds the kitchen-garden should be judged too little for the supply of fruit, there may be a cross Wall built through the middle of the kitchen-garden; or, where the size of the garden will admit, there may be two cross Walls built; but this must not be done, where there is not room to place the Walls at least eighty or one hundred feet asunder; and if they are allowed a much greater distance it will be better; and as the kitchen-garden should always be placed out of sight from the house, the Walls may be hid by plantations of trees, at some little distance, which will be of use in sheltering the fruit.

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The best aspect for Walls in England is, to have one point to the eastward of the south, for these will enjoy the benefit of the morning sun, and will be less exposed to the west and south-west winds (which are very injurious to fruits in England) than those Walls which are built due south. I know there are many persons who object to the turning of Walls the least point to the east, on account of the blights which they say come from that quarter in the spring; but from many years experience and observation I can affirm, that blights as often attack those Walls which are open to the south-west, as those which are built to any other aspect; and I believe, whoever will be at the trouble to observe for seven years, which aspected Walls suffer most from blights, will find those which are built with a point to the eastward of the south, as seldom blighted, as those which are turned to any other aspect; therefore, in the contrivance of a kitchen-garden, there should be as great length of these Walls built, as the situation of the ground will admit.

The next best aspect is due south, and the next to that south-east, which is preferable to the south-west, for the reasons before assigned; but as there will, for the most part, be south-west, and west Walls in every garden, these may be planted with some sorts of fruit, which do not require so much heat to ripen them, as those designed for the best Walls; but wherever there are north Walls, those will only be proper for baking Pears, Plums, and Morello Cherries for preserving, or some Duke Cherries may be planted against these Walls, to continue them longer in the season, which will be found useful in supplying the table till Peaches, Nectarines, and Plums, are ripe.

Where persons are very curious to have good fruit, they erect a trellis against their Walls, which projects about two inches from them, to which they fasten their trees; which is an excellent method, because the fruit will be at a proper distance from the Walls, so as not to be injured by them, and will have all the advantage of their heat; and by this method the Walls will not be injured by driving nails into their joints, which by every year being drawn out, draws out the mortar from between the bricks, and thereby makes holes, in which snails and other vermin will harbour and destroy the fruit, and the Walls will be also greatly impaired.

These trellisses may be contrived according to the sorts of fruit which are planted against them. Those which are designed for Peaches, Nectarines, and Apricots (which, for the most part, produce their fruit on the young wood) should have their rails three, or at most four inches asunder every way; but for the other sorts of fruit, which continue bearing on the old wood, they may be five or six inches apart, and those for Vines may be eight or nine inches distance. For as the shoots of Vines are always trained at a much greater distance than those of any other sort of fruit, the trellisses for these need not be near so close, especially as those must for Peaches and Nectarines, whose shoots are generally shortened to about five or six inches or less; so that if the rails are not pretty close, many of the short branches cannot be fastened to them.

These trellisses may be made of any sort of timber, according to the expence which the owner is willing to bestow; but Fir is most commonly used for this purpose, which if made of yellow deal, well dried and painted, will last many years; but if any person will go to the expence of Oak, it will last found much longer, especially if the trees are fallen in winter. And if any one is unwilling to be at the expence of either, then a trellis may be made of Ash poles, in the same manner as is practised in making espaliers for counter borders, with this difference only, that every fourth upright rail or post should be very strong, and fastened with iron hooks to the Wall, which will support the whole; and as these rails must be laid much closer together, than is generally practised for espaliers, these strong upright rails or posts should not be farther distant than three, or at most four feet

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from each other. To these the cross rails which are laid horizontally should be well nailed, which will secure them from being displaced, and also strengthen the trellis, but the other smaller upright poles need only be fastened with wire. To these trellisses the shoots of the trees should be fastened with osier twigs, rope-yarn, or any other soft bandage, for they must not be nailed to it, because that will decay the wood-work.

These trellisses need not be erected until the trees are well spread, and begin to bear fruit plentifully; before which time the young trees may be trained up against any ordinary low espaliers, made only of a few slender Ash poles, or any other slender sticks; by which contrivance the trellisses will be new when the trees come to bearing, and will last many years after the trees have overspread them; whereas, when they are made before the trees are planted, they will be half decayed before the trees attain half their growth. Where these trellisses are intended to be made against new Walls, it will be proper to fasten some strong iron hooks into the Wall as it is built, at the distance which the upright posts are intended to be placed; because when these are afterwards driven into the Wall, they displace the mortar in the joints, and injure the Wall. In the building of the Walls round a kitchen-garden, the insides, which are designed to be planted with fruit-trees, should be made as plain as possible, so that the piers should not project on those sides above four inches at most; and these should be placed about fourteen feet asunder, in such Walls as are designed for Peach and Nectarine-trees; so that each tree may be planted exactly in the middle between the piers, which will render them more slightly, and be better for the trees; but where Apricots, Plums, or Cherries are to be planted, the piers may be only ten feet asunder; and against every other pier the trees should be planted, which will allow them sufficient room to spread; as the trellis will project as forward as the piers, the branches of the trees may be trained on a plain; but when the piers project no more on the inside of the garden, they should be built stronger on the outside, for the better supporting of the Walls.

The usual thickness which garden Walls are allowed, if built with bricks, is thirteen inches, which is one brick and a half, but this should be proportionable to the height; for if they are built twelve or fourteen feet high or more, as is often practised, then the foundations of the Walls should be at least two bricks and a half thick, and brought up a foot or more above the level of the surface of the ground, of the same thickness; then they should be set off two inches on each side, which will reduce them to two bricks; and five or six feet above the surface of the ground, they may be diminished on each side, to reduce them to the thickness of a brick and a half; which must be continued to the top of the Walls, and the piers in these high Walls should also be proportionably stronger than is commonly allowed to lower Walls; for as these will be much more exposed to strong gales of wind, if they are not well built, they will be in danger of being blown down; therefore the piers of these Walls should be projected the length of a brick on their back-side, and the thickness of a brick on their front; and if these are built about ten or twelve feet asunder, they will greatly strengthen the Walls.

But there is no necessity for building Walls higher than nine or ten feet, unless it be for Pears, which, if properly managed, will spread over a great compass of walling; but as only some of the latest winter Pears require the assistance of a Wall, there need no more but that part of the Wall where these are designed to be built higher; for Peaches and Nectarines never require a Wall higher than nine or ten feet, provided they are rightly managed; because whenever they are carried to a greater height, the lower part of the Wall is unfurnished with bearing branches; and although Apricots, Plums, and Cherries will frequently grow higher, yet, if they are planted at a proper distance, and the branches trained horizontally from the bottom, they

they will not soon cover a Wall of this height ; and Vines may be kept as low as any sort of fruit, for when they are planted against low Walls, they must be treated somewhat after the same manner as those in vineyards, which is, to cut out the greatest part of the wood which produced fruit the preceding year, and train in new shoots for the next year's bearing, which are rarely left a yard in length, therefore will not require very high Walls.

If the Pears which are designed to be planted, are allowed a south-west aspect, on which they will ripen very well, then the Wall to this aspect should be built fourteen feet high or more ; for as these trees spread very far when on free stocks, they should not be shortened and stopped in their growth, which will prevent their bearing, by causing them to send out a great number of gross luxuriant shoots, which will never produce fruit ; therefore these should never be planted amongst other sorts of fruit-trees which are of less growth, because then the Walls must appear very unsightly, in having some trees planted more than double the distance which the others require ; so that there is no other sort of fruit which requires the assistance of Walls to ripen their fruit, which need so great room for spreading as Pears, except it be Figs, a few trees of which may be planted against the same Walls where there is room ; though these may be planted against the back Walls of offices or stables, where there is conveniency, because this fruit is seldom coveted by servants ; and being planted in places which are much frequented, they will not be in so much danger of being destroyed by birds, as those which are in private places. But I shall now proceed to give some directions for the building of hot Walls, to accelerate the ripening of fruits, which is now pretty much practised in England.

In some places these Walls are built at a very great expence, and so contrived as to consume a great quantity of fuel ; but where they are judiciously built, the first expence will not be near so great, nor will the charge of fuel be very considerable, because there will be no necessity of making fires more than three or four months, beginning about the middle or latter end of January, and ending by the end of May, when there will be no want of fires, if the glasses are close shut every night, or in bad weather ; for half an hour's sun-shine on the glasses at that season will sufficiently warm the air inclosed in the glasses, for the growth of any of our European fruits.

There are some persons who plant Vines, and other fruit-trees by the sides of stoves, and draw some of their branches into the stove, in order to obtain early fruit ; but this is by no means right, where the stove is designed for Ananas, because the air must be kept much warmer for them than is required for any of the other fruits, so that they can never succeed well together ; for when there is only a sufficient quantity of air admitted for the growth of the other fruit, the Ananas are starved for want of proper heat ; and so on the contrary, when the stove is kept up to the proper heat for the Ananas, it will be too hot for other fruits ; and it will also be proper to have the Vines on a particular Wall by themselves, because these require to have a greater share of air admitted to them when they begin to shoot, than some other sorts of fruit, so that it is by much the better method to have them separate.

The ordinary height of those hot Walls is about ten feet, which will be sufficient for any of those sorts of fruits which are generally forced ; for by forcing of the trees, they are commonly weakened in their growth, so that they will not grow so vigorously as those which are always exposed to the open air ; and where there is not a quantity of Walling planted sufficient to let one part rest every other year, the trees will never be very healthy, and will last but a few years. The quantity of Walling to produce early fruit for a middling family, cannot be less than eighty or one hundred feet in length ; therefore where a person is desirous to have the fruit in perfection, and the trees

to continue in a good condition many years, there should be three times this quantity of Walling built ; so that by dividing it into three parts, there will be two years for the trees to recover their vigour between the times of their being forced, whereby a greater quantity of bearing wood may be obtained, and the fruit will be fairer, and in larger quantities, than when they are forced every year, or every other year ; and as the glasses may be contrived so as to move from one to the other, the expence of building the Walls so much longer, will not be very great, because the frames and glasses will be the same as for one year's fruit.

The foundations of these Walls should be made four bricks and a half thick, in order to support the flues ; otherwise, if part of them rest on brick-work, and the other part on the ground, they will settle unequally, and soon be out of order ; for wherever there happen any cracks in the flues, through which the smoke can make its escape, it will prevent their drawing ; and if the smoke gets within the glasses, it will greatly injure the fruit, and give it a smoky taste. This thickness of Wall need not be continued more than six inches above the ground, where should be the foundation or bottom of the first flue, which will be sufficient to raise it above the damps of the earth ; then the Walls may be set off four inches on each side, which will reduce it to the thickness of three bricks and a half, so that the back Wall may be two bricks thick, which is absolutely necessary to throw the heat out more in front ; for when the back Walls are built too thin, the heat will escape through them. The Wall in front next to the fruit, should be only four inches thick, whereby there will be allowance of nine inches for the flues, which may be covered with twelve inch tiles ; for if they have an inch and a half bearing on each side, it will be sufficient. The ovens in which the fires are made, must be contrived on the backside of the Walls, which should be in number proportionable to the length of the Walls. The length usually allowed for each fire to warm is forty feet, though they will do very well for fifty feet ; but I would not advise the flues to be longer than this to each fire, because when the ovens are made at a great distance, there is a necessity of making the fires so much stronger to warm the Walls, which will occasion the heat to be too violent near the fires. These ovens should be shedded over, to keep out the wind and rain, otherwise the fires will not burn equally. Some people make these sheds of timber, but it is much better to build them of brick, and tile them over, because the wooden sheds will in a few years decay, and afterwards be a constant charge to keep them in repair ; and besides they may be in danger of firing, if great care is not constantly taken of the fires. As it is absolutely necessary to have the ovens below the foundation of the first flues, there must be steps down into the sheds, to come to the mouth of the ovens to supply the fuel, therefore the sheds should not be narrower than eight feet in the clear ; for as the steps will require four feet space, there should be at least four feet more for the person who attends the fire, to have room to turn himself to clear out the ashes, and to put in the fuel. Where the length of Walling requires two ovens, it will be proper to have them in the middle included in one shed, which will save expence, and allow more room to attend the fires ; for in this case the sheds must be at least ten feet long, and they need not be more than six in breadth. The steps down into these should be at one end, so that the door opening into the sheds will not be opposite to the mouths of the ovens, therefore the fires will burn more regular ; for whenever the doors are contrived to front the mouth of the ovens, if the wind sets directly against them, it will cause the fire to burn too fiercely, and the fuel will be soon consumed.

These ovens may be contrived in the same manner as those which are already described for stoves, wherefore I shall not repeat it again in this place ; but

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must observe, that when the two ovens are joined together, there should be a partition Wall at least three bricks thick between them, otherwise the fires will soon destroy it; and if there should be the least hole in the Wall, through which the smoke of the two fires can communicate, it will prevent their drawing.

The lower flue, through which the smoke first passes from the fire, may be two feet and a half deep: therefore the back Wall should be at least two bricks and a half thick, as high as to the top of this flue; and then it may be set off to two bricks, which must be continued to the top of the Wall. The second flue, which should return over the first, may be made two feet, the third a foot and a half, and the fourth one foot deep; which four flues, with their coverings, will rise near eight feet in height; so that there will be about two feet left for fixing of the frames at the top to support the glasses, and for the coping of the Wall. And these four returns will be sufficient to warm the air in the frames, for the smoke will have lost its heat by the time it has passed thus far.

In the carrying up of these Walls, there should be some strong iron hooks fastened at convenient distances, which should project about two inches from the Wall, to which the trellis must be fastened which is to support the trees. These hooks should be long enough to fasten into the back Wall, for the Wall in front being but four inches thick, will not be strong enough to support the trellis; but in placing of them care should be taken not to lay them cross the middle of the flues, because they would obstruct the clearing the flues of soot whenever there should be occasion; so that the best way is to lay them just under the tiles which cover each flue, at about three or four feet asunder, which will be near enough, provided the hooks are made sufficiently strong. As the flues must be well pargetered with loam on their inside, so likewise should the loam be spread under the tiles which cover them, to the thickness of the hooks, that the flues may be very smooth, otherwise the soot will hang to the iron hooks, and stop the smoke from passing. It will be very proper to cover these flues on the side next the trellis with Hop-bags, or some such coarse cloth, in the manner as hath been directed for the stoves, which will make them so tight that no smoke will find its way into the frame, which, without this covering, it is very apt to do through the joints of Walls, especially when they are so thin as these must be built; and this covering will also strengthen the wall of the flues, and join the whole work together. If at each end of these flues there are small arches turned in the back Walls, in such a manner that there may be holes opened to clean the flues of soot whenever there is a necessity for it, the trouble will be much less than to open the flues in front, by which there will be no damage done to the trees, nor will the flues be in the least injured by this, which they must be, when they are opened in front.

The borders in front of these hot Walls should be about four feet wide, which will make a sufficient declivity for the sloping glasses; and in these borders there may be a row of Dwarf Peas planted to come early, or a row of dwarf Kidney-beans, either of which will succeed very well; and if they are not planted too near the trees, will not do them much injury. On the outside of these borders should be low Walls erected, which should rise four or six inches above the level of the borders, upon which the plate of timber should be laid, on which the sloping glasses are to rest; and this Wall will keep up the earth of the border, and also preserve the wood from rotting.

The glasses which are designed to cover these Walls, must be divided into two ranges, for as they must reach from the ground-plate (just above the level of the border) to almost the top of the Wall, they will be more than twelve feet long, which will be too great a length for single frames, which, when they are much more than six feet long, are too heavy to move, especially if the frames are made of a proper strength to sustain the glass. These frames should

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be contrived in such a manner, as that the upper row may slide down; and by making on one side three small holes in the wood-work which supports the frames, at about a foot distance, and having a small iron pin to fix into them, the top glasses may be let down one, two, or three feet, according as there may be occasion to admit air. The lower row of glasses may be contrived so as to take easily out; but as they must lie sloping, and the upper row must bear on them, they cannot be contrived to slide upwards; nor indeed will there be any occasion for their moving, because it is much better to let the air in at the top, than in the front of the trees.

The sloping timbers which are to support the glass frames, must be fastened at bottom into the ground-plate in the front of the border, and at the top into strong iron cramps fixed in the upper part of the Wall for that purpose. These timbers should be made of Fir, which will not twist, as Oak and some other wood will, where it is laid in such position. They must be made substantial, otherwise they will not last many years, especially as they are designed to be moveable. On the top of these should be fixed a strong board, under which the upper row of glasses should slide. The use of this board is, to secure the upper part of the glasses from being raised by the winds, and also to keep the wet from getting to the trees; therefore it should be joined as close as possible to the Wall, and should project about two inches over the glass frames, which will be enough to throw the wet on the glasses, and likewise to secure them fast down.

The breadth of these frames for the glasses may be about three feet or a little more, according as the divisions of the length of the Wall will admit; for a small matter in their width is of no consequence, provided they are not too wide to be easily moved; for when they are wider than a man can easily reach his arms to manage, they will be very troublesome to carry from one place to another. The bars of these frames, which are to support the glass, should be placed lengthwise of the frames; for when they are placed across, they stop the moisture which is lodged on the inside of the glasses, and cause it to fall in drops on the borders at every bar, which will be very injurious to any plants which are put there; and if it falls on the trees will greatly damage them, especially when they are in blossom. The lead into which the glasses of these frames are fixed, should be very broad, and the joints well cemented, otherwise the wet will find an easy passage through, and do great damage to the fruit.

At each end of the range of glasses, there will be an angular space between the glasses and the Wall, which must be closely stopped to prevent the air from getting in, which might greatly injure the fruit. These are by some persons closely boarded up; but if they are closed with glasses, so contrived as to open to let in air at proper times, it will be of great advantage; because when the wind may be strong against the front-glasses, one or both of these end-glasses may be opened, according to the warmth of the air inclosed, which will be often very useful to cool the air, and to admit a small quantity of fresh air to the fruit.

The sorts of fruit which are usually planted for forcing, are Cherries, Plums, Peaches, Apricots, and Nectarines, but the last-mentioned rarely succeed well, nor will the trees continue long, so that they are scarce worth planting against hot Walls. As for the Vines, I would propose they should be planted by themselves against a particular Wall; for as they will require more air to be admitted to them when they begin to shoot, than any of the above-mentioned fruits, they will not all succeed if they are included in the same frame. As to the others, they will do very well in the same border, and will demand the same temperature of warmth. The best of these sorts to plant against these hot Walls, are those here mentioned:

Cherries.

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Cherries.

The Early May, and May Duke.

Plums.

The Mirabelle.

The Early Black Damask, or Morocco.

The Great Damask Violet of Tours.

The Drap d'Or.

Peaches.

The Red Nutmeg.

The Red Magdelain.

The Montauban.

Early Newington.

Violet Hative.

Nectarines.

Fairchild's Early Nutmeg.

The Elruge.

Apricot.

The Masculine.

These being the sorts which ripen early, are the most proper to plant against these Walls; although they are not so valuable as some other sorts of these fruits: yet, as they naturally ripen three weeks or a month earlier in the season, they will be very early ripe, when they are brought forward by artificial warmth.

In the preparing of the borders for planting these fruit-trees, there should be the same care taken as for those against open borders, which, being fully treated of in another part of this work, I shall not repeat here. There must also be the same care in training up the trees when they shoot; but the trellises need not be made against these Walls till the trees are grown large enough to spread, and produce a quantity of fruit; till which time they may be supported by any low ordinary trellis, which will do very well till the time that the trees will have strength enough to force, which will not be until the fourth or fifth year after planting, according to the progress they have made; for if they are forced too young, it will weaken them so much, as that they seldom make vigorous trees afterward; besides the quantity of fruit which such young trees produce, is not worth the expence and trouble of forcing; for the quantity of fuel used, and the trouble will be the same for small trees, which are not capable of producing more than six or eight fruit each, as for those trees which may produce three or four dozen; so that the greater time the trees have to grow before they are forced, the better they will pay for the trouble and expence.

But it will be the best way not to have any of the frames made, nor the trellis, or any other of the wood-work, until the trees are strong enough to force; for if these are done when the Walls are first built, as is by some persons practised, they will be half decayed before there is any use for them; but then the persons who are employed in making the trellis, must be very careful in putting it up, not to injure the trees.

When the trees have acquired strength enough to produce a quantity of fruit, the part which is designed to be forced the following spring, should be carefully pruned early in autumn, when the very weak shoots must be either entirely cut out, or pruned very short, because these, by being forced, will for the most part decay; and though some of them may be full of flower-buds, yet these shoots being weak cannot nourish them; so that the flowers having exhausted all the sap, the shoots will die soon after, and rarely produce any fruit, or at least do not bring them to perfection. The other more vigorous shoots should also be shortened to a proper length, after the same manner as is directed for those trees in the open air, with this difference only, viz. that these which are designed for forcing, should not have their shoots left so long, because the forcing of them will weaken them; and consequently, should there be as great a length of branches, there will probably be a greater number of fruit on them; because, as these will be screened from the open air, they will not be liable to blasts, or the

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injuries of the frost; and the having too many fruit on the trees will render them small, and also too much weaken the trees; then the shoots should be all regularly fastened to the trellis, at a proper distance from each other, so that when the branches shoot the following spring, they may not over-hang each other. The reason for my advising these trees to be pruned so early in the season, is, that those branches which are left on, may enjoy the whole nourishment of the sap, so that the buds will become very turgid during the winter season, and will be prepared to open when the fires are set to work.

The time for beginning to make the fires is about the middle or latter end of January, according as the season is more or less favourable; for if the trees are forced too early into flower, they will be in some danger of miscarrying, if the weather should prove severe; so that it is by much the surest method to begin about the time here directed, because there will be a necessity of admitting fresh air to the trees when they are in flower, which cannot be done safely when they flower in very bad weather. And those trees which are forced into flower by the middle of February, will ripen their fruit as early as most people will desire to eat them; for the Cherries will ripen early in April, and the Apricots by the beginning of May, and soon after the Plums, Peaches, and Nectarines, will be ripe.

There are some persons who plant Strawberries in their borders before the fruit-trees, in order to have early fruit, which often succeed very well; but wherever this is practised, great care should be taken to keep them from spreading over the border, because these plants will exhaust the principal goodness of the earth, and thereby injure the trees; so that when it is designed to have Strawberries in these borders, I would advise, that the roots should be either planted in pots, or singly at a good distance on a shady border of loamy earth, one year before they are designed to be forced; during which time the runners should be diligently pulled off, to encourage the main roots for fruiting; and at Michaelmas these plants may be transplanted, with large balls of earth to their roots, into the borders, before the fruit-trees which are to be forced the following spring, so that they may have time to get new root before that season; and if these plants are carefully watered when they begin to shew their flower-buds, they will produce a good quantity of fruit, which will ripen the latter end of April, or the beginning of May; but then I would also advise, that these plants be taken away as soon as they have done bearing, that they may not rob the trees of their nourishment.

Since I have mentioned this method of having early Strawberries, I shall take the liberty to insert another method, which is often practised to obtain this fruit early in the spring, though it doth not so properly come under this article, which is to train up the plants either in pots or borders, after the manner before directed, for at least one year or more; then in the beginning of February there should be a moderate hot-bed prepared, in length proportionable to the number of plants designed to be forced, and the breadth should be proportionable to the width of the frames which are designed to cover them. These frames may be such as are used for common hot-beds, to raise early Cucumbers, &c. This hot-bed must be covered with fresh loamy earth about eight inches thick, into which the Strawberry plants should be placed, with large balls of earth to the roots, as close as they can conveniently be planted; (for as they must be kept clear from runners, they will not spread much during the time they remain in the bed, which will be no longer than until their fruit is gone.) Then they should be gently watered to settle the earth to their roots, which must be frequently repeated as the earth becomes dry, otherwise they will produce new fruit. While the nights continue cold, the glasses of the hot-bed should be covered with mats, to preserve a kindly warmth in the beds; but in the day time, when the weather is favourable,

vourable, the glasses should be raised to admit fresh air to the plants; for if they are too much drawn, (especially when they begin to flower) they will not produce much fruit. If the season should continue long cold, and the heat of the beds should decline, it will be proper to lay some fresh hot dung round the sides of the beds to renew their heat, being always careful not to make them too hot, for that will scorch their roots, and prevent their fruiting. If the plants which are planted in these beds are strong, and in a good condition for bearing, and care be taken in transplanting of them to preserve good balls of earth to their roots, as also to keep a due temperature of warmth in the beds, they will produce ripe fruit by the end of April, or the beginning of May, in plenty; and will continue bearing, until some of those in the open air come in to succeed them.

The best kinds of Strawberries to plant for forcing, are the Scarlet and Alpine, for the Hautboys grow too rampant for this purpose.

But to return to the subject of hot Walls; what I have here inserted concerning the forcing of fruits, has been only to obtain these fruits earlier in the season, than they would naturally ripen against common Walls. But in some parts of England, where most of our good kinds of fruit seldom ripen, it might be very well worth while to build some of these Walls, to obtain good fruit from the best kinds of Peaches, Plums, &c. especially in such places where fuel is plenty, because there the expence will not be great after the first building of the Walls. For I would not propose to have coverings of glass, excepting for a small proportion of the Walls; the rest may have frames of canvas, or oiled paper, to shut over them, in the same manner as the glasses are contrived, which will succeed very well where proper care is taken; for as there will not be occasion to cover these trees until the beginning of March, at which time also the fires must be made, so before the trees are in flower, the weather may be frequently warm enough to open the covers to admit sun and air to the trees in the middle of the day; for if these covers are kept too closely shut, the shoots of the trees will draw very weak, and their leaves will turn pale for want of light and air. And as the design of these contrivances is only to bring the trees into flower three, or at most four weeks earlier, than they would naturally come against common Walls, there will be no necessity of making very large fires, or keeping the covers too closely over the trees.

Instead of canvas for these covers, oiled papers may be used, which should be done in the manner directed for raising of Melons, by pasting as many sheets of paper together, as will fit the frames on which they are to be fixed; and when the paste is dry, the paper should be fastened into the frames, and then the oil rubbed over on the outside with a brush, which will soak through the paper, and when the paper is dry, the covers may be used. This paper will last very well one season, and the expence of repairing it will not be very great; wherefore these are to be preferred to the canvas, because all sorts of plants will thrive much better under them, than they will under canvas, or any other close covering, which will not admit the rays of the light so well through to the plants. The frames designed for either canvas or paper may be made much lighter than those for glass, because these being very light, will not require so much strength to support them; and if these are well painted, and every year, when their use is over, carried into shelter, they will last a long time, for they will not be wanted abroad longer than three months, viz. from the beginning of March to the end of May; for after this time the fruit will not require any covering, the trees being then full of leaves, and the young shoots will by that time have made such progress, as to become a good defence for the fruit; but these covers should not be too suddenly taken away, but by degrees the trees should be inured to the open air, otherwise the change will be too great, and may occasion

most of the fruit to fall off, especially if cold nights should follow.

By this method gentlemen may be supplied with most of the best kinds of fruit in the northern parts of England, where without some such care, they cannot expect much good fruit in their gardens. And as coal is in great plenty in those places, the expence will be very little; therefore I am surprised that most of the gentlemen who live in the north, do not put this method in practice. That there are some few of these Walls built in the north is well known, but then they are chiefly designed to produce a little early fruit, more for curiosity than any real use; and these Walls are, for the most part, so ill contrived, that four times the fuel is expended, as will be requisite when the Walls are built after the manner here directed; and where the heat is not pretty equally distributed through every part of the Wall, some of the trees will have too much heat, while others will have little benefit from the fires.

There are some persons who build their hot Walls in such a manner, as to have the greatest heat under the border, near the roots of the trees, supposing there is a necessity for heat to the roots, as well as the branches; but this is a great mistake, for the fires must greatly injure the roots of the trees, by drying up the moisture of the earth, as also in scorching the tender fibres of those roots which lie near them; therefore this practice should not be continued, for it is much the better method to elevate the first flue nine inches or a foot above the level of the border, according as the ground is dry or wet, than to place it the least below ground, which will only dry the earth, and not warm the air about the trees, which is the only use of artificial heat; for it is very commonly practised to draw a branch of a Vine, or other fruit-tree, into a stove, which branch will produce its fruit as early as if the whole tree had been forced; when, at the same time, all the other branches of the same tree, which are exposed to the open air, will not be the least forwarded, though they are all nourished by the same root; which is a plain proof, that there is no necessity for adding any warmth to the roots of fruit-trees, to have their fruit earlier or better ripened.

I have also heard of some Walls which have been built for forcing of fruit, with one continued chasm from their bottoms to the top, so that they have been like double Walls, with places at proper distances to make the fires; but these can be of little use, for if the Walls are open at their tops to let out the smoke, the heat will also escape with it; because, if the smoke be not led about three or four times in flues in order to warm the bricks, the heat will pass off at the top, without doing much service to the trees.

Where the Walls are planted with the best kinds of fruit, which are designed to ripen them in perfection, if the autumns should prove cold, or very wet, before the fruit are ripe, it will be proper to put the covers over the trees; and if there are some slow fires made to dry off the damps, it will be of great use to prevent the fruit from growing mouldy, and to hasten their ripening; but when this is practised, the covers should be taken off, whenever the weather will admit of it, that the fruit may enjoy the benefit of the free air, without which they will be insipid or ill-tasted. Although in the former directions for forcing trees in order to have early fruit, I have advised, that such trees should have one or two years rest in order to recover vigour, yet that is not to be understood of these trees, which are only designed to be brought forward enough to produce their fruit in perfection; for as the fires are not designed to be made till the beginning of March, the trees will not be weakened thereby, because they will be inured to the open air long before their fruit is ripe, and will have time to ripen their shoots, and form their buds for the next year's bearing; therefore these trees may be thus forced every year, without doing them much injury, provided they are carefully managed.

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In forcing of fruit-trees people generally hang up thermometers under their glasses, for the better adjusting the heat and regulating the fires; but when this is practised, they should be hung where the sun can never shine on them, for one hour's sun-shine upon the ball or tube of the thermometer, in the spring of the year, will so much rarefy the spirits, that they will rise to the top of the tube, when, at the same time, the circumambient air may not be much more than of a temperate heat; but as the principal use of these thermometers is to regulate the fires, they are seldom of much use in the day time; because, if there be only one hour's sun-shine in the day on the glasses, it will warm the air sufficiently for the production of European fruits, without any additional heat; wherefore there will rarely be occasion for continuing of the fires in the day, unless the weather should prove very bad. And if, by the fires in the night, the air is warmed to the temperate point marked on the botanic thermometers, the fruit will thrive much better than in greater heat.

There are some persons near London, who make it their business to raise early fruit to supply the markets, which they perform by the heat of dung only, having no fire Walls in their gardens. The method which these people follow, is to have a good quantity of new dung laid in a heap to warm (after the same manner as is practised for making of hot-beds.) When this dung is in a proper temperature of heat, they lay it close on the back side of their fruit Wall, about four feet thick at the bottom, and sloping to about ten inches or a foot thick at the top. This dung should be gently beat down with a fork to prevent the heat going off too soon, but it should not be trodden down too hard, lest that should prevent its heating. The outside of the dung should be laid as smooth as possible, that the wet may run off more easily; and if there is a covering of thatch, as is sometimes practised, it preserves the dung from rotting too soon, whereby the heat is continued the longer. The time for laying this dung to the back of the Wall is somewhat later than for making the fires, i. e. about the middle of February. The first parcel of dung will continue warm about a month or five weeks, when there should be a supply of new dung prepared, and the old taken quite away, or mixed up with this new dung, to renew the heat, which, if it works kindly, will be sufficient to last the season. These Walls are covered with glasses or oiled paper, in the same manner as the fire Walls, and the trees must be treated in the same way; but there must be more care taken to open the glasses against these Walls, whenever the weather will permit, otherwise the steam of the dung will occasion a great dampness through the Wall, which, if pent in about the trees, will be very pernicious to them, especially at the time they are in flower.

By this method some gardeners have forced long Walls filled with old well-grown fruit-trees, which have produced great quantities of fruit annually, which has well answered their expence; but as, in many parts of England, it will be very difficult to procure a sufficient quantity of new dung for this purpose, therefore fire Walls are most useful, and least expensive in such places.

I have seen in some places long timber fences erected to force fruit-trees, by laying new dung against the back side, in the same manner as is practised for the Walls, but these are by no means proper, because the steam of the dung will easily get through every little crack or joint of the boards, to the great prejudice of the trees; besides, these boards will continue very damp, as long as any moisture remains in the dung, which will also be very injurious to them; and as these boards will in a few years decay, these will be more expensive than Walls, if they are kept in repair for some years, and will never answer the design so well.

WALL FLOWER. See CHEIRANTHUS.

WALNUT. See JUGLANS.

WALTHERIA. Lin. Gen. Plant. 741.

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The CHARACTERS are,

The flower is of the malvaceous tribe, and has a cup-shaped permanent empalement of one leaf, cut into five points at the rim; it has five heart-shaped petals which spread open, and five stamina, joined in a cylinder, terminated by loose summits, and an oval germen, supporting a single style, crowned by a bifid stigma. The germen turns to an oval capsule with one cell, inclosing one obtuse seed.

This genus of plants is ranged in the first section of Linnæus's sixteenth class, which includes those plants whose flowers have five stamina joined in one body or column.

The SPECIES are,

1. WALTHERIA (*Americana*) foliis ovalibus plicatis serrato-dentatis capitulis pedunculatis. Lin. Sp. Plant. 941. *Waltheria with oval plaited leaves, which are saw-indented, and the flowers on foot-stalks.* Althæa Americana pumila, flore luteo ipicato. Breyn. Cent. 1. f. 57. *Low American Marsh Mallow with a yellow spiked flower.*

2. WALTHERIA (*Indica*) foliis ovatis ferratis plicatis, capitulis sessilibus. Prod. Leyd. 348. *Waltheria with oval, sawed, plaited leaves, and the heads of flowers sitting close to the branches.* Betonica arborefcens, villôsis foliis profunde venosis, floribus ex alis foliorum glomeratis. Pluk. Mant. 31.

3. WALTHERIA (*Angustifolia*) foliis lanceolatis ferratis, capitulis pedunculatis. Prod. Leyd. 348. *Waltheria with spear-shaped sawed leaves, and heads of flowers upon foot-stalks.* Betonica arborefcens Maderaspatana villosa, foliis profunde venosis. Pluk. Alm. 67. tab. 150. *Tree-like Betony of Madras, with hairy deep-veined leaves.*

This genus of plants is described in the French Memoirs of the Academy of Sciences, by Mons. D'Inard, who has given it the title of Monospermalthæa, from the habit of the plant being like Althæa; and, having a single seed to each flower, he compounded this name; but Dr. Linnæus has altered it to this of Waltheria, in honour of Augustus Frederic Walther, Professor at Leipzig, who is a curious botanist.

The first sort grows naturally in the Brasils, and also in many parts of the islands in the West-Indies; it has a soft ligneous stalk which rises about two feet high, sending out two or three side branches. The leaves are oblong, oval, plain, and sawed on their edges, of a pale yellowish green colour, soft and hairy, and are placed alternately. The flowers are collected in a close thick spike at the top of the stalk, having soft hairy empalements; they are composed of five petals, connected at their base, which are small, of a bright yellow colour, and spread open; these are each succeeded by angular seeds which ripen in the empalement. It flowers in July and August, and the seeds ripen in autumn.

The second sort grows naturally in both Indies; this rises with a shrubby branching stalk to the height of eight or ten feet, covered with soft hairs. The leaves are placed alternately upon foot-stalks; they are four inches long, and two broad in the middle, and are rounded at both ends, of a yellowish green colour, very hairy and soft, having several longitudinal veins. From the wings of the branches arise the foot-stalks of the flowers, which sit close to the branches, and are terminated by clusters of very small yellow flowers, which just peep out of their soft hairy empalements. The flowers are succeeded by a single seed wrapped in the empalement of the flower. It flowers most of the summer months, and the seeds ripen in succession.

The third sort grows naturally at Campeachy and in India; from the first place the seeds were sent me. The stalks of this are ligneous; they rise six or seven feet high, dividing into several branches, which are less hairy than those of the former sort. The leaves are spear-shaped, about three inches and a half long, and one inch and a half broad; they are of a yellowish green colour, sawed on their edges, and hairy, but are not so soft as those of the former, having many veins running from the midrib, standing upon long foot-stalks. The flowers are very small, yellow, and are collected into round clusters, standing upon very short

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foot-stalks, close to the wings of the leaves; these appear in June, July, and August, and the seeds ripen in autumn.

These plants are propagated by seeds, which must be sown on a hot-bed; and when the plants are fit to transplant, they must be each planted into a separate small pot, and plunged into a fresh hot-bed, and afterward treated in the same manner as other tender plants of the same country, for they must be kept in the bark-stove, otherwise they will not thrive in England. The second year the plants will flower and produce good seeds, but the plants may be continued three or four years if they are often shifted, and the roots pared, to keep them within compass; for if they are permitted to remain long undisturbed in the tan-bed, their roots will run out through the holes in the bottom of the pots, and extend to a great distance in the tan; and when this happens, if their roots are torn, or cut off, the plants seldom survive it. When the plants root into the tan, they grow very luxuriant, and cannot be kept within reasonable compass; but on their roots being disturbed, their branches will hang, and their leaves shrivel up and drop off; therefore, to keep these plants within bounds, they should be drawn up out of the tan at least once in six weeks, during the summer season, and the plants shifted out of the pots once in two months; with this management the two last sorts may be continued several years, but the first seldom lives longer than two years.

WARNERA. *Hydrastis*. Lin. Gen. 704.

The CHARACTERS are,

The flower hath no empalement, but consists of three oval regular petals, including a great number of linear compressed stamina which are shorter than the petals, terminated by obtuse compressed summits. It hath many germen collected into an oval head, having short styles, crowned by broad compressed stigmas. The germen becomes one berry, composed of many oblong acini like Strawberries, including one oblong seed in each.

This genus of plants is ranged in the seventh section of Linnæus's thirteenth class, which contains those plants whose flowers have many male and female organs of generation.

The title of this genus is given to it in honour of Richard Warner, Esq; of Woodford-row, Essex, who is a very curious botanist, and a great collector of growing plants.

We know but one SPECIES of this plant at present, viz.

WARNERA (*Canadensis*.) *Warnera*, or *Yellow Root*. *Hydrastis*. Lin. Sp. 784. *Water Herb*.

This plant grows naturally in Canada, and several other parts of North America; the root is composed of thick fleshy tubers of a deep yellow colour within, but covered by a brown skin, sending out fibres from several parts in the spring; it sends up one or two foot-stalks about nine inches high, on which are one or two lobated leaves on the side, which are composed of hand-shaped leaves, which are sawed on their borders; the foot-stalk is terminated by one flower, composed of three oval white petals, including many stamina and styles, and is succeeded by a fruit composed of many acini like those of Strawberries, which when ripe, change to a red colour; it flowers in May, and the fruit is ripe in July.

This plant is pretty uncommon in the English gardens, where it does not increase much; it delights in great shade and moisture; for when it is planted in dry ground, or much exposed to the sun, it rarely lives through one summer. Therefore it should be planted in a moist loamy soil, in a shady situation, where it should remain undisturbed three or four years.

WATER is one of the most considerable requisites belonging to a garden: if a garden be without it, it brings a certain mortality upon whatsoever is planted. By waterings the great droughts in summer are allayed, which would infallibly burn up most plants, had we not the help of Water to qualify the excessive heats; besides, as to noble seats, the beauty that

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Water will add, in making jets d'eau, and cascades, which are some of the noblest ornaments of a garden, if rightly placed. I shall first take notice of the qualities of Water, with the several opinions of the most eminent philosophers thereon, and then take notice of the beauty which large pieces of Water add to such seats as are conveniently situated for them.

Sir Isaac Newton defines Water (when pure) to be a very fluid salt, volatile, and void of all flavour and taste; and it seems to consist of small, hard, porous, spherical particles of equal diameters, and equal specific gravities; and also that there are between them spaces so large, and ranged in such a manner, as to be pervious on all sides.

Their smoothness accounts for their sliding easily over the surfaces of one another.

Their sphericity keeps them from touching one another in more points than one, and by both these, their frictions, in sliding over one another, are rendered the least possible.

The hardness of them accounts for the incompressibility of Water, when it is free from the intermixture of air.

The porosity of Water is so very great, that there is at least forty times as much space as matter in it, for Water is nineteen times specifically lighter than gold, and of consequence rarer in the same proportion; but gold will, by pressure, let Water pass through its pores, and therefore may be supposed to have (at least) more pores than solid parts.

Mons. Le Clerc says there are these things observable in Water, which naturalists study to know, and account for:

1. It is transparent; because, as some are of opinion, it consists of flexible particles like ropes, which are not so close as to leave no pores, nor so entangled, but that there are right lines enough to transmit the light.

For since the particles are not joined close together, and in perpetual motion, the very particles of light easily pass through their right lines, unless the Water be very deep, or put into motion by some outward cause; then, indeed, the transparency of Water is very much obstructed, and it looks of a cloudy obscure colour, as it is obvious to sight in a rough sea, for at such a time the vehement agitation of the Water disturbs their pores, and spoils their straightness.

2. Water is liquid, but capable of being fixed. Water seems to be liquid for the same reason that other bodies are so; for since the particles of it are flexible like ropes, and leave pores between one another, which are filled with finer matter; when this matter is put into a vehement commotion, the particles are easily tossed about every where; yet when the motion of this restless matter is restrained, as it is in winter, then the Water congeals into ice, whether this comes of cold only, or there be, besides, nitrous particles, which fall out of the air at that time, and with their rigidity fix the watery ones.

3. It may be made hot or cold, the particles of Water being, as has before been said, ice, are soon dissolved by the motion of those of fire; for the particles of fire, getting into the pores of the ice, mightily shake the fine flexible particles of it, and restore them to their former motion in a little time.

But, if this Water be set in cold air, the fiery particles will soon vanish, and the Water become as cold as before.

4. Water easily evaporates by the heat of fire or air. This is because its particles are quickly separated, and got into motion; so that the airy particles easily carry those of the Water about with them.

5. It is heavy, if compared with air, and some other bodies, but much heavier than air. It has been shewn, by various experiments, that the gravity of the air in the place where we live, is to that of Water, as one to eight hundred, or something more; so that Water is eight hundred times heavier than air. And for this reason a bladder, or any other thing, filled with air, can

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can hardly be sunk under Water; and indeed, to make air sink, there must be a weight added to it that shall exceed the weight of the Water as much, and something more, than that of the Water exceeds that of the air.

Hence it comes to pass, that Water easily supports wood, and vast ships fraught with the heaviest cargo; for the weight alone will never sink them, unless the goods and vessel together should make up a weight which exceeds that of Water; and as salt Water is heavier than fresh, it bears a greater weight.

Those things which are heavier than Water, as stones, metals, &c. when they are thrown into it, go straight down to the bottom; and as their weight is greater, by so much the quicker; while other bodies, which are of the same weight with the Water, neither float on the surface, nor sink quite down, but remain suspended between the top and bottom, as is seen in the carcasses of animals.

6. Water is insipid, and without smell. The reason is, because its flexible parts slip gently over the tongue, and are not sharp enough to prick the nerves, and affect the taste; but this is to be understood of pure Water, void of all kind of salt, such as distilled Water is, and next, that of rain; for the most wholesome fountain Water commonly derives a saltiness from the earth; though in this place are not meant medicinal fountain Waters, the taste of which is more acute, but such Water as is usually drunk.

And that it is without smell; the purer any Water is, the less smell it has; for the reason why the particles do not prick the tongue, is the reason why they do not affect the smell. The flexibility and smoothness of Water is such, that they cannot pierce the olfactory nerves; for some fountain Water has indeed some smell, but then it is a sign that it is not pure.

7. Water is subject to putrify, according as the place is where it is kept. Water will grow thick and stinking by heat and rest, as we find it does in ponds and marshes, and in close vessels; but here it ought to be remembered, that this is what was spoken of before, as such Water is not pure, for unmixed Water cannot putrify. This is proved,

First, by distilled Water, which may be kept very long without putrefaction.

Secondly, in rain Water, which is caught in clean vessels, and presently stopped up close, and buried under ground, which is kept many years in countries where they want fountains. This shews that the cause of putrefaction is not in the Water itself, but in other things that are mingled with it; because pure Water, such as is distilled, or comes from the clouds, keeps sweet for a great while; but then those vessels in which such Water is kept, must be so well stopped, that the least fly may not get into them; and they must be made of such stuff as will not corrupt, such as glass or clay.

But as for standing Water, in ponds or marshes, that is corrupted two ways:

1. By the nature of the soil, which often abounds with noisome sulphur, whereby the Water is impregnated, and comes to smell in warm weather, as it does at Amsterdam, not only in the canals, but wherever the ground is opened for the foundations of houses. This putrefaction is owing to the soil, and not to the Water.

2. By the nasty things that are thrown into it, or bodies of insects which die in it, as also by the eggs of flies, which are dropped about wherever they go, and breed worms. Water is corrupted in wooden vessels, especially at sea, by the sulphureous parts of the wood, and by uncleanly things, as flies, eggs, &c.

Water penetrates the pores of those bodies, whose pores are wide enough to receive its particles; thus it enters the pores of sugar and salts, so as to separate and quite dissolve their particles; but it cannot get into the pores of stones, or but a very little way; so that it only wets their surface, without diluting them; hangs on the outside of them, because they are rough, and because the extremities of their pores are open a

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little way. But such bodies, when they are wet, are soon dried in the air, because the motion of the dry particles carries off the soft and smooth ones of the Water.

It is observable, that if bodies, rubbed over with oil or fat, be dipped in water, they get very little wet, because the roughness of their surface, whereon the Water should hang, is smoothed, and made even by the fat, and the mouths of the pores are closed up, so that there is nothing left for the watery particles to hold by, and therefore they must needs slide off.

Most liquors are formed by the cohesion of particles of different figures, magnitudes, gravities, and attractive powers, swimming in pure Water, or an aqueous fluid, which seems to be the common basis of all. And the only reason why there are so many sorts of Water differing from one another by different properties, is, that the corpuscles of salts and minerals, with which that element is impregnated, are equally various.

Wine is only Water impregnated with particles of Grapes, and beer is Water impregnated with particles of Barley, &c. All spirits seem to be Water saturated with saline and sulphureous particles.

And all liquors are more or less fluid, according to the greater or smaller cohesion of the particles, which swim in the aqueous fluid; and there is hardly any fluid without any cohesion of particles, not even pure Water itself, as will appear from the bubbles, which will sometimes stand on the surface of it as well as on that of spirits, and other liquors.

Water contributes much to the growth of bodies, in that it both renders and keeps the active principles fluid, so that they are capable of being conveyed by circulation into the pores.

The learned Dr. Halley has demonstrated, that if an atom of Water be expanded into a shell or bubble, whose diameter shall be ten times as great as before, such an atom would be superficially lighter than the air, and will rise so long as that status, or warm spirit, which at first separated or raised it from the mass of Water, shall continue to distend it to the same degree; but when that warmth declines, and the air grows cooler, and withal specifically lighter, these vapours will stop at a certain region of the air, or else descend. Therefore, if it should be supposed, that the whole earth were covered with Water, and that the sun should make his diurnal course round it, as now he does, he is of opinion, that the air would be impregnated with a certain quantity of aqueous vapours, which it would retain in it, like salts dissolved in Water; and that the sun in the day time warming the air, that part of the atmosphere would sustain a greater proportion of vapours (as warm weather will hold more salt in it dissolved than cold) which by the absence of the vapours at night would be discharged into dews.

And in this case he concludes, there could not be any diversity of weather, other than periodically every year alike; the mixture of all terrestrial, saline, and heterogeneous vapours here being excluded, which he judges to be, when variously compounded, and driven by winds, which are the causes of these various seasons and changes of weather which we now find.

But, instead of supposing an earth to be covered all over with Water, you suppose the sea interspersed about wide and spacious tracts of land, and also divided by high ridges of mountains, such as the Alps, the Appenine, and the Pyrenean, in Europe; the Caucasus, the Imaus, and the Taurus, in Asia; the Mount Atlas, and the mountains of the Moon, in Africa; the Andes and Apalachian mountains, in America; each of which surpasses the usual height, to which the aqueous vapours do of themselves ascend, and on the tops of which the air is so cold and rarefied, as to retain but a small part of these vapours, which are brought thither by the winds.

Then the vapours thus raised from the sea, and carried by the winds over the low lands to those ridges of mountains, are there compelled by the streams of the air,

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air, to mount with it up to their tops, where the Water presently precipitates, gleeting down by the crannies of the stones; and part of the vapours entering into the caverns of the hills, the Water thereof gathers, as in an alembic, in the basons of stones; and these being once full, the overplus of the Water runs down at the lowest place of the bason, and breaking out by the sides of the hills, form single springs, many of which run down by the vallies or guts between the ridges of the hills, and, after uniting, form little rivulets or brooks; and many of these meeting again, form large rivers.

Whether Water be originally a fluid? It is a point that has been controverted among philosophers, whether fluidity be the natural state of Water, or rather the effect of violence.

Sometimes we find it appear in a fluid form, and sometimes in a solid one; and as the former is the more usual in our warmer climate, we are apt to conclude fluidity to be its proper state, and suppose the other to proceed from the extraneous action of cold. But the learned Boerhaave asserts the contrary, and maintains, that Water is of the crystalline kind; because wherever a certain degree of fire (heat) is wanting to keep it in fusion, it readily grows into a hard glebe, which we call ice.

Mr. Boyle is much of the same opinion; he observes, that ice is commonly reputed to be Water, brought into a preternatural state by cold. But with regard to the nature of things, and setting aside our arbitrary ideas, it might as justly be said, that Water is ice, preternaturally thawed by heat. If it be urged, that ice left to itself will, upon the freezing agents being removed, return to Water, it may be answered, That, not to mention the snow and ice that lie all the summer long on the Alps, and other high mountains, even in the torrid zone, we have been assured, that in some parts of Siberia the surface of the ground continues more months of the year frozen, by the natural temperature of the climate, than it has been thawed by the heat of the sun; and a little below the surface of the ground, the Water which chanches to be lodged in the cavities there, continues in a state of ice all the year round; so that when, in the heat of summer, the fields are covered with Corn, if you dig three or four feet deep, you shall find ice, and a frozen soil.

Dr. Boerhaave is of opinion, That if Water could be had alone and pure, it would have all the requisites of an element, and be as simple as fire; but there has been no expedient hitherto found out for making it such.

Rain Water, which seems to be the purest of all those we know of, is replete with infinite exhalations of all kinds, which it imbibes from the air, so that though it be filtered and distilled ever so often, yet there still remain fæces.

The purest of all Waters we can any way arrive at, is that distilled from snow, gathered in a clear, still, pinching night, in some very high place, taking none but the outer, or superficial part thereof. By a number of repeated distillations thereof, the greatest part of the earth, and other fæces, may be separated from it; and this is what we must be content to call pure Water. Mr. Boyle indeed relates, that a friend of his by distilling a quantity of Water a hundred times, found at length, that he had got six tenths of the quantity in earth: whence he concludes, that the whole Water, by the further prosecuting the operation, might be converted into earth.

But it should be considered, that as the Water cannot be removed or poured into a vessel, without the mixture of some dust with it, so neither can the luting of the vessel be distilled without losing something every time; therefore Dr. Boerhaave rather concludes, That the Water thus often distilled, might acquire new earth from the dust floating in the air, and the instruments employed in the operation.

That author assures us, That after he had distilled some very pure Water by a gentle fire, for the space of four months, it appeared perfectly pure; and yet

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leaving it to rest in vessels perfectly closed, it conceived a certain kind of weedy matter, somewhat like the stamina of plants, or the little tufts of a mucilage; and yet it is related that Schotus saw Water in Kercher's Musæum, that had been kept in a vessel hermetically sealed upwards of fifty years; and yet it still remained clear and pure, and stood to the same height in the vessel as at the first, without the least sign of sediment.

Dr. Boerhaave adds, That he is convinced nobody ever saw a drop of pure Water; that the utmost of its purity known, only amounts to its being free from this and that sort of matter; and that it can never, for instance, be quite deprived of its salt, since air will always accompany it, and that has always salt. Water seems to be diffused every where, and to be present in all space where there is matter. There is not a body in all nature but will yield Water. It is also asserted, that even fire itself is not without Water. A single grain of the most fiery salt, which in a moment's time will penetrate through a man's hand, readily imbibes half its weight of Water, and melts even in the driest air imaginable. Thus salt of tartar, placed near the hottest fire, will attract or imbibe Water, and by that means increase considerably its weight in a small time. So in the driest summer's day, a pewter vessel with ice in it, brought up from some cold subterraneous place, into the hottest room, will immediately be covered with little drops of Water gathered from the contiguous air, and condensed by the coldness of the ice.

Even dry bodies afford a plenteous stock of Water. Dr. Boerhaave says, oil of vitriol, being exposed a long time to a violent fire, to separate all the Water from it as much as possible, did afterwards, by only standing a few minutes, contract fresh Water so fast, as soon to afford it as plenteously as at first.

And that hartshorn that had been kept for forty years, and was as hard and dry as any metal, so that if struck against a flint, it would yield sparks of fire; yet this very hartshorn being put into a glass vessel, and distilled, afforded him one eighth of its quantity of Water. He adds: we have known bones dead dried twenty-five years, and thus become almost as hard as iron, which yet, by distillation, afforded half their weight of Water; and the hardest stones ground and distilled, always discover a portion thereof.

Mr. Boyle, by distillation, found that eels yielded some oil, spirit, and volatile salt, besides the caput mortuum; yet all these were so disproportionate to the Water, that they seemed to have been nothing but that coagulated.

The same author, from human blood itself, as spirituous and elaborate a liquor as it is reputed, did, by distillation, out of seven ounces and a half, draw near six of phlegm, before ever any other of the principles began to rise.

Vipers, though they are esteemed hot in operation, and will, in a convenient air, survive for some days the loss of their heads and hearts, yet it is surprising how great a share of Water they yield by distillation. Some have been of the opinion, that Water was the common matter of all bodies. And Thales, with some other philosophers, have held, that all things were made of Water; which opinion, probably had its rise from the writings of Moses, where he speaks of the Spirit of God moving upon the face of the Waters.

But Mr. Boyle does not conceive the Water here mentioned by Moses, as the universal matter, to be our elementary Water; since though we should suppose it to have been an agitated congeries, consisting of a great variety of seminal principles, and of other corpuscles fit to be subdued and fashioned by them, it yet might be a body fluid like Water, in case the corpuscles it was made up of were, by their Creator, made small enough, and put into such an actual motion as might make them all roll, and glide over one another.

However,

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However, Bafis Valentine, Paracelfus, Van Helmont, Bentivoglio, and others have maintained, on his principles, that Water is the elemental matter or flamen of all things, and that it fuffices for the production of all things; which Helmont endeavours to prove from the following experiment.

He burnt a quantity of earth in a potter's vefsel, till fuch time as all the oil it contained was quite confumed; then mixing it with Water, he drew out all the falt. The earth thus prepared, he put into an earthen pot, fuch as is ufed by gardeners, and took care that nothing but rain Water could enter into the fame; and yet a Willow being planted in this earth, grew up to a confiderable height; whence he concluded, that Water was the only nutriment of the vegetable kind, as vegetables are of the animal.

The fame thing Mr. Boyle likewise argued from a fimilar experiment, and the whole is countenanced by Sir Ifaac Newton, who obferves, that Water ftanding a few days in the open air, yields a tincture, which, like that of malt, by ftanding longer, yields a fedi-ment and a fpirit; but before putrefaction, is fit nourifhment for animals and vegetables.

But Dr. Woodward endeavours to fhew, that they were both miftaken; proving, that Water contains in it divers extraneous corpuscles, and that fome of thefe are the proper matter of nutrition; Water being found to afford fo much the lefs nourifhment, the more it is purified. Thus Mint planted in Water purified by diffillation, will not grow fo faft, as if put in Water not diffilled; and if the Water be diffilled three or four times over, the plant will fcarce grow at all, or receive any nourifhment from it.

So that Water as fuch, is not the proper nutriment of vegetables, but only the vehicle thereof; which contains the nutritious particles, and carries them along with it through all the parts of the plants; fo that a Water plant, e. g. a Water Crefs, being put in a glafs vefsel full of Water, will be found to contain the more falt and oil.

In effect, Water nourifhes the lefs, the more it is purged of its faponaceous falts, in its pure ftate it may fuffice to extend or fwell the parts, but affords no new vegetable matter.

Of the fluidity of Water.

Water, fays Dr. Boerhaave, is fluid, but the fluidity is not natural thereto; for naturally, it is of the cryftalline kind; and accordingly, wherever a certain degree of fire is wanting, there we fee Water become ice. That this ice is the proper effect of the want of heat, and not of any additional fpicula introduced into the Water, as Mariotte and others contend, is evident enough, were it only hence, that on this fuppoftion, it could not penetrate the fubftance of all bodies, as we find it does, and even that of metals.

This Water in its ftate of folution, never remains at reft; its parts are in perpetual motion, as was firft difcovered by the French with the help of microscopes; and is farther confirmed by this, that if a little Saffron be fufpended in the middle of a vefsel full of Water, the Saffron colour will in a little time, form as it were, a kind of atmofphere around, and at length be diffufed through the whole Water. Now this could no way be effected without a motion of the watery particles among each other. Add, that if you caft a quantity of the drieft falt, in the coldeft weather into Water, it will foon be diffolved; which argues the continual motion of the particles of that element.

He adds, that he had more than once filled a large wide vefsel with Water, and narrowly watched with a good microfcope, but could never perceive it without fome fort of undulatory motion.

Water fcarce ever continues two moments exactly of the fame weight; but is always varying more or lefs, by reafon of the air and fire contained in it. Thus if you lay a piece of pure limpid ice in a nice balance,

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you will find it continue in equilibrio. The expansion of Water, in boiling, fhews what effect the different degree that fire has on the gravity of Water.

This uncertainty makes it difficult to fix the fpecific gravity of Water, in order to fettle its degree of purity; but this we may fay in the general, that the pureft Water we can procure is, that which weighs 880 times as much as air.

However, neither have we any tolerable ftandard for air; for Water being fo much heavier than air, the more Water is contained in air, the heavier of courfe muft it be; as in effect, the principal part of the weight of the atmofphere, feems to arife from the Water.

Of all Waters, the pureft is that which falls in rain in a cold feafon, and a ftill day; and this we muft be content to take for elementary Water. The rain Water in fummer, or when the atmofphere is in commotion it is certain, muft contain infinite kinds of heterogeneous matter. Thus if you gather the Water that falls after a thunder clap in a fultry fummer's day, and let it ftand and fettle, you will find a real falt fticking at the bottom; but in winter, efpecially when it freezes, the exhalations are but few, fo that the rain falls without much adulteration; and hence, what is thus gathered in the morning, is found of good ufe for taking away spots in the face; and that gathered from fnow, againft inflammations in the eye. Yet this rain Water, with all its purity, may be filtred and diffilled a thoufand times, and it will ftill leave fome fæces behind it; fo that to procure the pureft Water poffible, a man muft look for it in a fpacious plain in the winter time, when the earth is covered with fnow, and its pores locked up with froft.

The next in point of purity is fpring Water. This, according to Dr. Halley, is collected from the air itfelf; which, being faturated with Water, and coming to be condensed by the evening's cold, is driven againft the cold tops of mountains, where, being farther condensed and collected, it gleets down or diffils, as much as in an alembic.

Spring Water becomes the better by running; for during all its courfe, it is depofiting what heterogeneous matters it contained; but while the river drives on its Waters in an uninterrupted ftream, all its falts, with all the vegetable and animal matters drained into it, either from exhalations, or from the ground it wafhes gradually, either fink to the bottom, or are driven to the fhore.

But what Water defcends from fprings on the tops of mountains, is generally pretty free from heterogeneous bodies.

Of the foluteive power of Water.

Water confidered as a menftruum, diffolves,

1. All falts; as fugar, borax, &c. which air only diffolves by virtue of the Water it contains; which fire only liquifies, and earth leaves untouched, fo that Water alone is the proper menftruum of falts.

The particles of falts, as has been obferved, can in- finuate themfelves into the interfices between the particles of Water; but when thofe interfices are filled with any falt, the fame Water will not any longer diffolve the fame falt; but a falt of another kind it will, by reafon its particles being of a different form, will enter and occupy the vacancies left by the former. And thus again, it will diffolve a third or fourth falt, &c. So when Water has imbibed its fill of common falt, it will ftill diffolve nitre; and when faturated with heat, will diffolve fal armoniac; and fo on.

2. It diffolves all faline bodies; it being the conftituent quality of a faline body, to be uninflammable and diffoluble in Water. Hence Water may diffolve all bodies, even the heaviest and moft compact, as metals, inafmuch as thefe are capable of being reduced into a faline form; for thefe may be fo intimately diffolved by Water, as to be fufained therein.

3. It diffolves all faponaceous bodies, i. e. all alkali-

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linous salts and oils blended together : these two bodies make a sapo, which is a saline body, but not a salt. Now oil itself is not dissoluble in Water ; but the admixture of the salt here rendering it saline, Water readily dissolves it.

All the humours in the human body, are apparently saline, though none of them are salt itself. The same may be said of the juices of all vegetables, excepting the oils, which accordingly dissolve in Water.

Salts are the active instruments of nature ; and yet these do not act, unless dissolved either by Water or fire.

4. It dissolves glass itself ; for this, if melted with salt of tartar, becomes soluble in Water.

5. It dissolves all gummous bodies ; this being part of the definition of a gum, that it dissolves in Water, in contradistinction from a resin : but oleaginous bodies it leaves untouched ; nay, and what is more extraordinary, it repels them ; and by repelling, drives the oily particles into eddies.

If a hundred drops of oil be thrown upon Water, all the several drops, which before were perfectly dispersed, will soon gather together again, and leave the Water alone ; so that there should be some repugnance between Water and oil, and some attraction between the particles of Water, as also between that of oil.

Add, that Water seems to repel all oleaginous, fatty bodies, wherein oil predominates ; and hence also it is, that the fatty parts in our bodies escape being dissolved by Water ; and it is in all probability, by this means, that fat is collected in the adipose cells of all animals.

Nor does Water dissolve sulphur ; for though you boil sulphur ever so long in Water, yet it will still remain untouched.

Nor does it dissolve terrene or earthy bodies, but rather unites and consolidates them ; as we see in tiles, &c.

Water however, mixed with alkaline salts, dissolves oil, and oily bodies ; thus though mere Water poured on greasy wool be repelled thereby, and contributes nothing towards cleansing the same ; yet mix a strong lixivium, or an alkaline salt with the Water, and then it readily dissolves, and absorbs all that is greasy and oleaginous ; and thus it is woollen cloths are scoured. But neither will Water alone do, as being immiscible with oil, nor will any other sort of salts ; for sea Water, with all its salts, will never wash out any oily impurities. So, in the ordinary methods of scouring and fulling, the stuffs are washed in stale, putrefied, human urine, which is known to be a thorough alkali. Lastly ; it does not dissolve resin, as we conceive a resin to be no other than an inspissated or concentrated oil.

Having thus fully treated of the properties of Water philosophically, I shall next consider it as essentially necessary in gardens for use, and also of the beauty which Water adds to gardens, where it can be obtained in plenty, if it is properly disposed ; and first of its use.

In the kitchen-garden, Water is absolutely necessary, for without it there can be little expected ; therefore in such places where there cannot be a supply of Water obtained for basons or ponds, wells must be dug ; and where the depth to the Water is too great to be raised by pumps, there must be either machines for raising it contrived, or it must be drawn by hand ; but in such places which are so unhappily situated, as to require machines for the raising of Water from a great depth, there is but small encouragement to make kitchen-gardens ; for then constant supplying of Water in those dry situations will be attended with great expence, and generally the produce of such land is of little worth, especially in dry seasons.

Where kitchen-gardens are supplied with Water from wells, there should be a contrivance of large cisterns, into which the Water should be raised, to be exposed to the sun and air some time before it is used ; for the rawness of this Water, when fresh drawn from

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wells, is not agreeable to the growth of vegetables ; so that where large ponds are in the neighbourhood of these gardens, from whence the Water can be led into them, that is by much the best for the growth of vegetables ; next to this, river Water is to be preferred, especially from those rivers which run through or near large towns, where the Water is fattened by the soil thrown into the rivers ; but the Water of some very clear rivers, is as hard as that from the deepest springs, rising through gravel or sand ; but the springs issuing through chalk are generally much softer.

If good Water can be obtained in plenty from the neighbourhood of the kitchen-garden, then there should be two or three basons made in different parts of the garden, so that no part of the garden should be too far distant from the Water ; for where the Water is to be carried to a considerable distance, the expence of labour will be great, and there will be great danger of the plants suffering, from their being but sparingly watered ; labourers being very apt to slight their work, when attended with trouble, if they are not well looked after. The size of these basons should be in proportion to the quantity of Water which will be required, or that they can be supplied with, but their depth should not be more than four feet ; for when they are deeper, there is danger of persons being drowned, if by accident they should fall into them ; besides Water, when very deep, is not so well warmed and tempered by the sun and air, as when it is shallow ; therefore the Water of shallow basons is best for the use of gardens.

In making of these basons, there must be particular regard had to the natural soil of the garden, for in loose sandy land there will require much care in making of the clay walls so as to hold Water ; but where the ground is loamy, or inclining to clay, there will be little difficulty in making basons, and the clay walls need not be so thick. Where the ground is loose, the clay walls at the bottom should not be less than two feet thick, and those on the sides one foot and a half. The clay should be well wrought over and trod after it is taken from the pit, before it is used in building the wall. The true sign of good clay is, that it be close and firm, without any mixture of sand, and that it be fat and tenacious in handling : as for the colour, it is no matter whether it be green, yellow, blue, or red ; but before the clay is brought to the place, the bason should be dug out and formed ; for if the clay is too long exposed to the sun and air, it will not be so fit for use, especially if it be laid in small parcels.

The best time of the year for making basons, is in autumn when the sun is declining, and the weather temperate ; for in the spring of the year the east and north-east winds generally blow, which are drying ; so that the clay walls, which are not very carefully covered as fast as they are made, very often crack in many places ; and these small cracks often grow wider, and the Water will find a passage through them. The same inconveniency happens from the violent heat of the sun in summer ; for when the clay dries fast, it will be very difficult (not to say impossible) to prevent its cracking, and these will let off the Water ; and if the clay wall should not be well made at first, it will be very difficult to mend it after ; besides the uncertainty there is in finding out the places through which the Water finds a passage, which is seldom done without strictly examining every part of the clay.

When the ground is dug out level, where the bason is designed, the clay must be brought in, and laid very carefully in the bottom, being very careful that no dirt or small stones be mixed with the clay ; and there must be some Water thrown from time to time upon it, as it is closely trod by mens naked feet, and then it must be rammed very close : in the performing of this, there must be great care taken that every part of the clay is equally kneaded and rammed, without which there will be great danger of the Wa-

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ter making its way through those parts of the clay which are not well wrought. After the bottom is finished with clay, there should be a stratum of coarse gravel laid over it about four or five inches thick, which will greatly secure the clay wall, and render the Water clear; but where the basons are large, so that the clay walls are long in making, the clay should be covered with moist litter to prevent its drying, which may be taken off when the whole is finished, to lay on the gravel; but if part of the side walls are finished before this is done, it will be the better, because there may be some Water let into the bason as soon as the gravel is laid, which will prevent the clay from cracking; then the walls round the side of the bason must be carried up with the same care as hath been directed for the bottom, observing also to cover the clay first with litter while the work is carrying on, and afterward lay it with coarse gravel; and as the walls are finished round, the Water may be let in, to secure the clay from drying and cracking.

When the whole is finished, the upper part of the walls must be laid with turf, which will secure them from being broken, and prevent the sun from penetrating the clay; but before this is done, there must be a stratum of sand laid upon the clay, four or five inches thick, and upon this a thin stratum of good earth laid, for the Grass to take root in. The bed of sand will prevent the Grass from rooting into the clay, and this will also keep out the frost, which will penetrate the clay, where there is not a covering of sand to secure it, and by being frozen and swelled, and afterward drying, the clay is very apt to crack in many places. The turf on the side of the bason should be laid as far down as the Water is apt to shrink, that no part of the clay may be wholly exposed to the weather, for the reasons before given.

Where these basons are made, there should be no trees growing near, for the roots of trees or shrubs will extend themselves to the clay walls, and by penetrating them will occasion fissures, through which the Water will find an easy passage; and where tall trees are growing near basons or ponds, the shaking of the trees with violent winds is apt to loosen the clay walls, and occasion cracks in them, therefore these cautions are necessary to be observed.

In some countries, where clay cannot be easily procured, the walls of these basons are frequently made of chalk, which is beaten into fine powder, and made into a sort of mortar, and with this the walls are made, by ramming and working it very hard and firm. These basons hold Water very well where they can be well supplied with it, so as not to be too long dry, for when it so happens, the sun and wind dry the chalk, and cause it to crack, and these cracks commonly extend through the thickness of the walls, so as to let off the Water.

There are others who build their walls with brick laid in terrass, which is a good method for such places where the ground is very loose and sandy, because the walls, when well built, will support the loose earth from falling or settling away from the sides; but where terrass is used, the walls should not be long dry and exposed, for the heat is apt to crack the terrass.

Some persons make a cement of powdered tile and lime, two thirds of the former to one third of the latter, being very careful in the mixing of it not to add too much Water, but to labour it well in the beating, which is a principal thing to be observed. With this cement they cover the surface of the walls of basons, about two inches thick, laying the plaister very smooth, and being very careful that no sticks, straws, or stones are mixed with it; this plaistering is commonly performed in dry weather, and as soon as it is finished, it is rubbed over with oil or bullock's blood, and the Water let into the bason as soon as possible. This cement has the property of hardening under Water, so as to be equal to stone, and will continue as long sound.

Whatever the materials are with which the walls are

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made, there must be great care taken, that they are built so strong, as that they may resist the weight of the Water; so that where the ground about the bason is not very solid, the walls should be thicker, and supported on the backside by buttresses of the same materials, placed at proper distances; or if the walls are made of clay, there should be planks supported by strong timbers placed at proper distances to support the clay, otherwise there will be great danger of their being broken down, especially where the basons are large, so as that the winds have room to act upon the surface of the Water, and drive it in large waves against the banks, the sides of which should have a very easy slope.

The directions here given are only for basons or reservoirs of Water for use, so must not be supposed for large pieces of Water for beauty; for where the ground is of a loose sandy nature, so as not to hold Water, the expence of claying the bottom and sides will be too great, if the Water is of a large extent, therefore it would be imprudent to attempt it in such places; but where there is a supply of Water, and the ground is well adapted to hold it, there can be no greater beauty than that which Water affords to a seat, provided it is properly disposed; therefore I shall give some general hints, by which persons may be directed in the forming of large pieces of Water, so as to render them beautiful.

In those places where there is a command of running Water, it will be a great additional beauty, because the Water will always be much clearer, so more beautiful than still Water; besides, if it moves with any degree of velocity, there may be one or more falls of Water contrived, which will still add to the beauty. In the conducting of this Water, the level of the ground must be carefully taken, for the great skill in the contriving of rivers, or other pieces of Water, is in the saving of expence in the digging; therefore where the ground is naturally low, the Water should be conducted through these low parts, and never endeavour to carry it through higher ground, for in such places the banks will be so high, as to shut out the sight of the Water, to persons who stand at a little distance from it on either side, unless the Water is very broad; and where it is so, the eye is thrown to a considerable distance over the surface of the Water, by the steepness of the banks, therefore the slopes on the side of Water should always be made as easy as possible; nor should they be made flat, with sharp edges on the top (as is too generally practised;) for these stiff regular slopes are not near so pleasing, as those which are made gently convex, for the eye will slide over these to the Water, having no ridge to cut the sight, and at a small distance there will be no appearance of a cut, as will always be seen where the upper part of the slope is finished in a sharp angle; and the great skill is to contrive, that as much of the surface of the Water may appear to the sight as possible. In most of the old gardens, where there are pieces of Water, there is nothing more common than to see them brought into regular figures, such as long strait canals or basons, either round or polygonal, so that all the boundaries of the Water are seen at one view; but these, however large may be their extent, are not near so pleasing as where the Water is so conducted, as that the termination may be seen as little as possible; for when the Water is lost from the sight, by some gentle easy turns, the imagination may be led to suppose the surface of the Water extended to a considerable distance; so that sometimes small pieces of Water are so artfully contrived, as to make them appear very considerable.

As in the old stile of laying out gardens, the Water was generally wrought into regular strait canals, which corresponded with the strait walks, hedges, and regular lines of trees, which were then chiefly studied; so, as the taste altered from this stiff method of disposing gardens, to that which approached nearer to nature in the forming of rivers, or other large pieces of Water, those who have succeeded best have always had

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had great regard to the natural situation of the ground, so as to lead the Water through the natural hollows of the ground, whereby the great expence of digging is saved; and by contriving to make the head in some narrow part of the ground, it may be done at a much less expence, and will be better secured, than where the head is of great extent; therefore it is better either to shorten the extent of the Water, or to carry it farther, according to the natural situation of the ground, than to terminate it where it may occasion great expence; and it is always observed, that where there is the greatest expence in the making of these large heads, the whole will appear less beautiful than where nature is chiefly consulted; for nothing can be more unsightly, than those extensive heads which are sometimes made to pieces of Water, which rise six or eight feet, and sometimes much more, above the surface of the ground, whereby the Water is hid from the sight, to those persons who are situated on that side of the head, and a large bank of earth shuts up the view; and sometimes these heads are so situated, as to appear in sight of the house, or from a principal part of the gardens, which is a very great absurdity.

Since the taste has been altered in the disposition of gardens, and that a more natural method has been pursued by persons of judgment, there have been great improvements made in the distribution of Waters, so as to render it truly ornamental to the seats where they are placed; but there are some, who, by pretending to imitate or copy from these works, have erred as much in making so many short unnatural turns in their Water, as those before-mentioned have done by their regular strait sides; for in what is usually termed serpentine rivers, nothing is more common than to see a small surface of Water twisted in so many short turns, as that many of them appear at one view; and these windings are often made like parts of circles, with such an air of stiffness, as to render them equally disagreeable with any the most studied figures, to persons of good taste. Another thing is also common to these unnatural pieces of Water, which is, their being made of the same width in every part, which should always be avoided; for nothing is more beautiful, than to see the Water extend to a large surface in some places, and to have it in others more contracted; and this may be generally done at a much less expence than the other, where the natural site of the ground is well considered, which should be done with the utmost care, before any work of this sort is begun, for want of which many persons have repented after having been at great expence.

There is also another material thing to be observed, in the situation of large pieces of Water, which is, never to extend them so near to the house, as that they may annoy it, by the damp, which the vapours exhaling from the Water may occasion, especially when exposed to the wind, which will drive the vapours toward the house, and thereby render the habitation unhealthy, and destroy the furniture; therefore it is much better to walk out to see the Water, than to sacrifice the habitation for the pleasure of seeing the Water from the house: nor should the Water be so situated, as that the surface may be level with the floor of the house, for there is generally some moisture, which will percolate through the veins of the earth, enough to occasion so much damp, as to render the lower part of the house unwholesome; and where there is a considerable damp in the foundation of a house, part of it will ascend upward, and render the apartments so, therefore great care should be had as to this.

Where persons are not so happily situated as to have the command of a constant running Water, but yet from some neighbouring reservoirs or ponds can be supplied with it, there may be some agreeable pieces of Water contrived, both for use and beauty, especially where there is a large supply; for otherwise it will be better to contract the de-

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sign; for nothing can be more ridiculous than that of having either ponds or rivers designed, where they cannot be supplied with Water in the dry seasons, when there is the greatest want of it, both for use and pleasure.

In those places where there is a great scarcity of Water, there should be large reservoirs contrived, into which the Water which descends from the hills and rising grounds may be led; so that a large body of Water may be collected during the rainy season, for a supply in time of drought; these reservoirs, when large, may contain as much Water as may be necessary for the use of the house and gardens; but these can rarely supply Water enough for beauty, therefore in such situations it should not be attempted.

As Water never appears so well as when it is situated near woods, so in the contrivance of rivers, or pieces of Water, they should be so placed as to have planting near, that the contrast between the wood and Water may appear as perfect as possible; and in some places where the Water can be seen through the open groves, between the stems of large trees, it will add greatly to the beauty of the place; but where the Water is designed to terminate, the head should be as much concealed as possible, by close plantations of evergreen trees, which may be faced with Alders and Weeping Willows, planted close on the sides of the Water, so as that their branches may hang over; and if the Water is contracted, and led through these trees with a gentle winding, it may seem to run much farther, and to communicate with a larger body of Water at a distance; in the contriving of which, the greatest art is to make it appear as natural as possible; for the less art there appears in these things, the longer they will please, and the more they will be esteemed by persons of good judgment.

WATSONIA.

The title of this genus is given to it in honour of my learned friend Dr. William Watson, F. R. S. whose knowledge in the science of botany justly demands this tribute.

The CHARACTERS are,

The flower hath a permanent spathe (or sheath) which divides into two parts almost to the bottom; it is of one petal. The tube is long, a little curved, and swells at the upper part; the rim is cut into six obtuse segments which spread open. It has three long slender stamina which are terminated by prostrate oblong summits, and a roundish three-cornered germen, supporting a slender style a little longer than the stamina, crowned by three bifid stigmas. The germen afterward turns to a roundish three-cornered capsule having three cells, opening with three valves, each containing three or four roundish seeds.

This genus belongs to the first section of Linnæus's third class, the flower having three male and one female part. It differs from the Gladiolus, in having a tubulous flower of one petal, and from Crinum, in having but three stamina.

This has been titled by Dr. Trew, *Meriana flore rubello*, before he had been acquainted with the name which I had applied to it; but he has since informed me by a letter, that as I had raised the plant from seeds, he would suppress his title, and adopt mine, who he thought had the most right to give it; and that he rather chuses to do so, because the figure he has published of it was drawn from the plant in the Chelsea Garden.

The SPECIES are,

1. *WATSONIA (Meriana) floribus infundibuliformibus, subæqualibus. Watsonia with funnel-shaped flowers whose petals are equal. Meriana flore rubello. Trew. tab. 40. Meriana with red flowers.*
2. *WATSONIA (Humilis) foliis gladiolatis, floribus majoribus. Dwarf Watsonia, with sword-shaped leaves and large flowers.*

These plants are natives in the country about the Cape of Good Hope. The root of the first sort is bulbous, compressed, and shaped like a kidney, and is covered with a fibrous brown skin. The leaves are sword-shaped,

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shaped, about a foot long, and an inch broad, ending in points; the two sides have sharp edges, but the middle is thicker, and has a prominent midrib; they are of a dark green colour, and rise immediately from the root. The stalk comes out from the root between the leaves, and rises a foot and a half high toward the upper part. The flowers are produced from the side, standing alternately at about an inch and a half distance from each other; they have each a spatha or sheath, composed of two leaves which are joined at their base, where they are broad, but gradually lessen to their points. Before the flowers appear, they are of the same green colour with the stalk, and are divided but a small part of their length, inclosing the flower, but afterward they are split almost to the bottom, and wither before the flowers decay, becoming dry, and wrap round the seed-vessel. The tube of the flower is an inch and a half long, narrow at the base, and a little curved, swelling much larger the upper half. The rim is divided into six obtuse segments which spread open, and are nearly equal; the flower is of a copper red colour on the outside, but of a deeper red within; it has three stamina a little longer than the petal, which are incurved, and are terminated by oblong summits of a dark brown colour, which are fastened in the middle to the apex of the stamina, lying prostrate. At the bottom of the tube of the petal is situated an oval three-cornered germen, supporting a slender style a little longer than the stamina, crowned by three bifid reflexed stigmas. The flowers generally appear in April or May, and the seeds ripen in July.

The seeds of this, and also some of the sorts of *Ixia*, were sent me by my friend Dr. Job Baister, F. R. S. of Zirkzee, which succeeded in the Chelsea Garden, where many of them have since produced their beautiful flowers.

The second sort is of a humbler growth than the first; the leaves of this are rarely more than six inches long, but are full as broad as those of the other sort, and of a lighter green colour; the flower-stalk rises between the leaves, about nine inches high, supporting four or five flowers sitting close thereto. The flowers are larger, but of the same colour with those of the other sort, and is later in flowering.

These plants are propagated by offsets from the root, in the same manner as the *Crocus* or *Gladiolus*, which are produced in pretty great plenty; the time for transplanting of the roots is in August, soon after the stalks decay; the larger roots must be each put into a separate pot filled with light fresh earth, and may be placed in the open air till toward the end of September, when the leaves will begin to appear above ground, at which time it will be proper to remove them into shelter; for as this plant is a native of a warm country, it will require some shelter from the frost, at least hitherto it has been so managed; for until the roots are become more common, it would be imprudent to venture them abroad in winter; tho' they may probably be hardy enough to resist the cold of our ordinary winters, when planted in a warm border and a dry soil, at least with a little shelter in hard frosts; for those plants which have been placed in an open airy glass-case, have succeeded better than those which have been in the stove; and the flowers have been much stronger, and of longer duration, though those in the stove have flowered a month earlier; but these have been so much drawn, as not to produce seeds; whereas those which have been treated pretty hardily, and had plenty of air, have seldom failed.

The best way of treating these roots, is to plunge the pots into an old bed of tanners bark, which has lost its heat some time in October; this bed should be covered with a frame, the glasses of which should be drawn off every day in mild weather, that they may enjoy as much free air as possible, to prevent their drawing up weak; but they must be covered in bad weather, and screened from frost. The latter end of March, when they begin to put out their flower-

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stalks, the pots should be removed to an airy glass-case, where they may stand to flower, and when the flowers are decayed, they should be placed in the open air to perfect their seeds.

The offsets and small roots may be planted three or four in a pot, according to their size, and should have the same treatment as the larger roots the first year, and by that time twelvemonth they will be strong enough to flower, so should have separate pots.

WEATHER is the state or disposition of the atmosphere, with regard to moisture or drought, heat or cold, wind or calm, rain, hail, frost, snow, fog, &c.

As it is in the atmosphere that all plants and animals live and breathe; and as that appears to be the great principle of most animal and vegetable productions, alterations, &c. there does not seem any thing in all philosophy of more immediate concernment to us, than the state of the Weather.

In effect, all living things are only assemblages or bundles of vessels, whose juices are kept in motion by the pressure of the atmosphere, and which, by that motion, maintain life; so that any alterations in the state of the rarity or density, the heat, purity, &c. of the atmosphere, must necessarily be attended with proportional ones with these. Almost every body knows what vast, yet regular alterations, a little change of Weather makes in a tube filled with mercury, or spirit of wine, by barometers, thermometers, hygrometers, &c. and we should not fail to feel as great and as regular alterations in the tubes, chords, and fibres of our own bodies, were it not partly for our inattention, and partly for our unequal and intermediate course of living.

The knowledge of the Weather is of great service in gardening and agriculture; but the imaginary prognostications of almanack writers have been found to be a mere delusive cant or jargon. There is nothing more wanting than a just theory of the Weather on mechanical principles.

Were registers carefully kept in divers parts of the globe for a good series of years, we might by them be enabled to determine the directions, breadth, and bounds of the winds, and of the Weather they bring with them; the correspondence between the Weather in divers places, and dependence between one sort and another at the same place, and thence we might in time learn to foretel divers great emergencies; as extraordinary heats, rains, frosts, droughts, dearths, &c. But in order to this, a complete history of the Weather will be required.

Indeed there have been some essays made this way by the members of our Royal Society, the French Academy of Sciences, and divers other persons of note; but the dryness of the subject has put a stop to their progress in that matter.

As for instance: Eras. Bartholinus has observations of the Weather every day throughout the year 1671; and Mr. Werle made the like at Oxford for seven years, from the year 1337, to 1343. Dr. Plot did the same at the same place for the year 1684. Mr. Hiller at Cape Corse, for the years 1686, and 1687, and Mr. Hunt, &c. at Gresham College, for the years 1695, 1696. Dr. Derham at Upminster in Essex, for the years 1691, 1692, 1697, 1698, 1699, 1703, 1704, 1705. Mr. Townly in Lancashire, for the years 1697, 1698. Mr. Cunningham at Emen in China, for the years 1698, 1699, 1700, 1701. Mr. Locke at Oats in Essex, 1692. Dr. Scheuchzer at Zurich, 1708; and Mr. Tilly at Pisa, the same year.

The most certain signs and prognostics of good and bad Weather may be collected from those things that are nearer to us than the orbs of the planets; nor need we go any farther than this our sublunary world, for the most probable conjectures in relation to the Weather; and may deduce our prognostications in relation thereto, from animals and vegetables, &c.

It is certain, that a great part of the brute creation have a sensibility and sagacity this way beyond man-

kind; and that without any means or disposition thereto, more than we, except that their vessels, fibres, &c. being in other respects in one equable habitude, the same, or a proportionable cause from without, has always a like or proportionable effect on them; that is, their vessels are regular barometers, &c. affected only from one external principle, viz. the disposition of the atmosphere; whereas ours are acted on by divers from within, as well as without; some of which check, impede, and prevent the action of others.

Animals that live in the open air must necessarily be supposed to have a quicker sense of it than men that live within doors; and especially the airy inhabitants, the birds, which live in the freest and clearest air, and are more apt, by their flight, and other motions, as well as their voices, to discover their sensations of it. Therefore those who have applied themselves to the observations of the signs and prognostics of good or bad Weather, have laid down these following rules:

Signs or prognostications of rainy Weather.

The Lord Bacon says, that water fowls, such as sea-gulls, moor-hens, &c. when they flock and fly together from the sea towards the shore, foretel rain and wind.

And, on the other hand, when land birds, such as crows, swallows, &c. fly from land to the waters, and beat the waters with their wings, it betokens rain and wind.

The natural reason of that seems to be, the pleasure that both land and water fowl take in the moistness and density of the air, and their love to be in motion, and upon the wing.

It is no strange thing that water fowls delight in that air which is most like water, their natural element; and that land fowl also, many of them, delight in bathing, and moist air.

And also, for the same reason, many birds prune their feathers; geese gaggle, and the crows call for rain; all which seems to be but the pleasure they take in the relaxation of the air.

When crows flock together in large flights, and hold their heads upward as they fly, and cry louder than they usually do, it is a sign of rain; and when they walk stalking by rivers and ponds, it is the same.

When swallows chatter, and fly low about lakes and ponds, (which they do, in order to catch flies; for the air, being clogged with vapours, hinders the flies from ascending) it bespeaks rain.

When peacocks cry much, when birds that usually perch upon trees fly to their nests, when fowls pick up their feathers with their bills, when cocks crow before their usual hour, and hens creep in clusters into the dust, they are signs of rainy Weather.

Not only birds, but beasts, give notice of rain; as when sheep leap mightily, and push at one another with their heads, it denotes rain.

When asses bray, or shake their ears, or are annoyed with flies; when deers fight, when foxes and wolves howl mightily, when hogs at play break or scatter their food, and oxen that are tied together, raise their heads and lick their snouts, it is a sign of rain.

When cattle leave off feeding, and make haste to shelter under bushes and hedges, &c. when cats rub their heads with their fore paws (especially that part of their heads which is above their ears) and lick their bodies with their tongues, it is a sign of rain.

Beasts generally delight in a moist air, and it causes them to eat their meat the better; cattle, deer, and rabbits, will feed heartily before rain. Heifers will put up their noses, and snuff in the air against rain. Sheep will rise early in a morning to feed against rain.

Also fishes, either sea or river fish, do often, by their playing towards the top of the waters, foretel rain. For this the Lord Bacon gives this reason, That when the Weather is dry, the fish love to keep as much as

they can from the air, and swim lower, and will not come near the air till it is moist.

Insects and reptiles also give prognostics of rain.

Ants quit their labour, and hide themselves in the ground against rain; for these provident insects, by a secret instinct in nature, carry their eggs and food to a place of drier security, when they find the air changed into moistness, and clogged with vapours.

Bees, when rain is coming on, do not stir from their hives, or at least not far.

Moles will cast up more earth; and earth-worms will creep out of the ground against rain.

Even the bodies of men and women give tokens of rain or frost, by aches, corns, and wounds, which will be more troublesome against such seasons; for rain makes the humours of the body to abound more, and frost makes them sharper.

Mr. Ozanam says, That the very body of all animals and vegetables is, as it were, a contexture of barometers, hygrometers, and thermometers; for the humours, with which organized bodies are replenished, increase or decrease, according to the different dispositions of the air.

Prognostics of the Weather from vegetables.

Mr. Pointer tells us, he has observed, that many, if not most vegetables, expand their flowers and down in sun-shiny Weather, and towards the evening, and against rain, close them again, especially at the beginning of their flowering, when their leaves are young and tender.

This is evident in the down of Dandelion and other downs, and evidently in the flowers of Pimpernel, the opening and shutting of which, he says, are the countryman's Weatherwiser.

And Mr. Gerard says, If the flowers be close shut, it betokens rain and foul Weather; but if they be spread abroad, fair Weather.

The Lord Bacon says, Trefoil swells in the stalk against rain, and so stands more upright; for by wet, stalks do erect, and leaves bow down; and Pliny says much to the same purpose.

The former says likewise, that there is in the stubble fields a small red flower, which country people call the Wincopipe (which is the Pimpernel); which, if it opens in the morning, you may be sure of a fair day to follow.

Mr. Ozanam gives, as a natural reason for this, that plants are a sort of natural hygrometers, which are composed of an infinite number of fibres, trachæ, or air-vessels, which are like so many canals or pipes, through which the moisture of the air, as well as the juice of the earth, is conveyed to all its parts.

These trachæ, or air-vessels are visible, and appear very pretty in the leaf of the Scabious, or the Vine; if you pull asunder some of its principal ribs, you may see between them the spiral air-vessels (like threads or cobwebs) a little uncoiled.

In warm dry weather, if the leaves of Cabbages, Cauliflowers, and other broad-leaved plants, are very lax, and hang down more than usual, it is a sure sign of rain in a short time.

There are many kinds of vegetables, whose surface of their leaves are altered in their position before rain, particularly most of those of the pulse kind, as Vetches, Beans, Saintfoin, Clover, &c. the leaves of these close, some of them turning their upper surface outward, and others their inner, and this they constantly do toward the evening at all times, for as the rays of the sun become oblique, so the vapours begin to rise from the ground; therefore those surfaces of the leaves which imbibe the greatest quantity of moisture, are turned outward to receive it. This change of the position of the leaves of plants in the evening has been idly called the sleep of plants, but those who will be at the trouble of consulting Mr. Bonnet's book on the use of the leaves of plants, will soon be convinced this alteration in the position of leaves is designed for a nobler purpose.

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Signs of rainy Weather by solid bodies.

The hardest and most solid wood will swell by the moisture of the air; this is evident by the difficulty of shutting doors and windows in wet weather; and boxes, especially of deal, and pegs of wood, when they draw and wind hard, are signs of wet Weather; and this is caused by the admission of air through the pores of the wood.

Mr. Ozanam says, The moist vapours do readily insinuate into wood, especially that which is light and dry, it being extremely porous; so that they are sometimes made use of in dilating and breaking the hardest bodies, and in particular mill-stones; for when they have cut a rock into a cylinder, they divide that into several lesser cylinders, by making several holes round the great cylinder, at proportional distances, according to the thickness they design the mill-stones, and then fill them with as many pieces of Sallow wood dried in an oven; for when the wet Weather comes, these wedges or pieces of wood become so impregnated with the moist corpuscles of the air, that they swell and break, or separate the cylindrical rock into several stones.

And stones, especially marble, will sweat against wet Weather, though it be from an outward cause; in that the stones are so hard and solid, as not to admit the moisture of the air, and therefore it only lies upon the superficies of the stones.

And the humidity of the air insinuates itself into the hardest bodies, which are not destitute of pores, and especially into light bodies that take up a great space.

Signs of rainy Weather from the planets.

By the sun. If the sun, at its rising, looks red, and broader than usual, then many moist vapours are gathering from the sea, and the air is thickening; and the beams of the sun, being diffused in it, cause the sun's face to shew a great deal bigger than usual; and in a short time you will perceive the clouds mustering, and overspreading the heavens, and the air condensing into a watery body.

If this happens in summer or autumn, when the Weather is hot, the showers that fall will be violent, but of short continuance; but if this happens in the winter or spring, it denotes settled rains, but more moderate.

It has been an observation, confirmed by long experience, That if the sun rises with a bluish circle, inclining to white, the air is gross and condensed, and rain will soon fall.

And if, when the sun rises, he is pale, and the sky is of a dusky red in the morning, it will be soon overcast, and there must quickly follow rain, attended with whisking winds.

Also if the sun rises of a misty muddy colour, or in a black cloud, and diffuses his rays palish toward the north and south, it foretels rain.

It has been an observation, That if the sun sets under a thick cloud, rain will fall the next day; or if it rains immediately, there will be a great deal of wind the next day; and this is almost the constant consequence of a pale setting sun.

Though a red sky at the sun rising is a sign of rain, yet a red sky when the sun sets is a sign of fair Weather; though indeed, if the sky be red at a great distance from the part where the sun sets, as in the east, there will be either rain or wind the next day.

As to the moon. A pale moon is a forerunner of rain, a red one of wind, and a clear one of fine Weather. When the moon is encompassed with a very large circle, or is dim and misty, then there will follow wind, rain, or snow, very quickly, probably within twenty-four hours.

If the horns of the moon, at her first rising, or within two or three days after her change, are blunt, it betokens rainy Weather from that quarter.

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An iris round the moon is also a sign of rain, with a south wind.

Two or three discontinued and speckled circles or rings round the moon, bespeak a storm.

Signs of rainy Weather from the clouds.

If in an evening there appear many small clouds from the west, it shews that rain is gathering, and will soon fall.

When clouds appear like rocks or towers, they signify great showers.

Mr. Ozanam says, That when we see little, black, loose clouds, wandering too and fro, lower than the rest, we apprehend a future storm; and when, at the rising of the sun, several clouds are seen to gather in the west, and, on the other hand, if these clouds disperse, it bespeaks fair Weather.

When the sun through the clouds appears double or triple, it shews a storm of long duration.

Signs of rain from the rainbow.

If the rainbow appears very big, it denotes much wet; but if very red, wind withal.

If a rainbow appears after a long drought, it signifies rain; but if it appears after a long time of wet, it betokens fair Weather.

If a rainbow appears in the morning, it betokens small rain, and fair Weather presently after.

If a rainbow vanishes altogether, fair Weather will follow, winds will arise, and bring great showers from the part that the rainbow first begins to break or vanish.

If the rainbow be broken in many parts, tempestuous winds are gathering in the air.

If, after a rainbow appears, the colours grow darker and darker, rain is gathering; if lighter, and the colours fairer, fair Weather.

Mr. Ozanam says, a rainbow in the east, especially if it be of a bright lively colour, is a sign of great rain. A rainbow in the east, in an evening, prefigures fair weather; but if the colour is lively and red, it prefigures wind.

A rainbow in the west foretels an indifferent quantity of rain and thunder.

If two rainbows appear together, it foretels fair Weather for the present, but rain two or three days after.

Prognostications of the Weather from mists.

If mists arise out of ponds and rivers to the top of hills, it betokens that there will be rain soon, either the same day, or commonly within two or three days; but if, when they arise out of such places, they vanish away, it is a sign of fair Weather.

If there be a general mist, both on the hills and vales, before the sun rising near the full moon, it denotes fair Weather.

Mr. Ozanam says, If you observe a white vapour arising upon waters, or marshes, or meads, after sunset, or before sun-rising, it will be fair warm Weather the next day.

Signs of fair Weather.

When the sun is fair and bright at its rising in a morning, and is blushing, without spots or black clouds near him when he sets at night, it is a sign of fair Weather.

When the moon is three or four days old, and has her horns sharp, and pointed very bright, it is a sign of fair Weather till she comes to the full, if not the whole month.

If the moon has a bright shining circle about her when she is at the full, it promises fair Weather for many days. When the stars shine out clear and bright, and seem to dart out pointed rays, it is a sign of fair Weather.

Also

Also when little clouds sink low, as into valleys at south-east, or south-west, it is a sign of fair Weather. If the tops of hills be clear, it is a sign of fair Weather.

If there are to the north-west white scattering clouds, like fleeces of wool, it is a sign of fair Weather.

When white clouds or mists hang just over rivers, and disperse no farther, it is a sign of fair Weather.

When a rainbow appears after a shower, and the blue or yellow part of it be very bright, and the highest colour, they are tokens of fair Weather.

When bees fly far from their hives, and come home late, it is a sign of fair Weather.

When there are great swarms of gnats, it prefigures fair Weather.

Glow-worms shining by night, are a sign of fair Weather.

When kites fly aloft, it bespeaks fair dry Weather.

The Lord Bacon gives this reason for it; because the kite mounts most into the air of that temper wherein he delights; for this aspiring bird does not so much affect the grossness of the air, as the cold and freshness of it; for being a bird of prey, and therefore hot, he delights in the fresh air.

When swallows fly high, it is a sign of fair Weather.

When owls whoot much, it is a sign of fair Weather; and though owls do always whoot much, both in wet and dry Weather, yet there is this difference, that their whooting is more clamorous in wet Weather, but more easy and sedate in fair Weather.

When halcyons, coots, and other sea fowls, leave the shores, and flock to the sea, it is a sign of fair Weather.

When cattle feed eagerly, without looking about them, it is a sign of fair Weather.

When fish rise frequently, and flirt upon the Water, it is a sign of fair Weather.

Spiders webs in the air, or on the Grass and trees, foretel much fair Weather.

1. A thick dark sky, lasting for some time, without either sun or rain, always becomes first fair then foul, i. e. changes to a fair clear sky ere it turns to rain. Thus the Rev. Mr. Clarke, who kept a register of the Weather for thirty years, since put into Dr. Derham's hand, by his grandson, the learned Dr. Samuel Clarke. This he says he hardly ever knew to fail, at least when the wind was in any of the easterly points; but Dr. Derham has observed the rule to hold good, be the wind where it will.

The cause is obvious. The atmosphere is replete with vapours, which, though sufficient to reflect and intercept the sun's rays from us, yet want density to descend; and while the vapours continue in the same state, the Weather will do so too. Accordingly such Weather is generally attended with moderate warmth, and little or no wind to disturb the vapours, and a heavy atmosphere to sustain them, the barometer being commonly high. But when the cold approaches, and by condensing drives the vapours into clouds or drops, then way is made for the sun beams, till the same vapours being by farther condensation formed into rain, fall down in drops.

2. A change in the warmth of the weather is generally followed by a change of the wind. Thus the northerly and southerly winds, commonly esteemed the causes of cold or warm weather, are really the effects of the cold or warmth of the atmosphere, of which Dr. Derham assures us he had so many confirmations, that he makes no doubt of it.

Thus it is common to see a warm southerly wind changed to the north, by the fall of snow or hail; or to see the wind in a cold frosty morning north, when the sun has well warmed the earth and air, wheel toward the south, and again turn northerly or easterly in the cold evening.

Prognostics of the Weather by the wind.

The winds, says Mr. Pointer, are the causes of the most sudden and extraordinary alterations of the air.

The nature of the winds is such, that, by the experience we have of them, we may very nearly predict what Weather we shall have for two or three days after. As for example: we know that in our climate a south wind generally brings rain, and a west wind more; and the west wind is the predominant wind with us, because the ocean lies on the west side of our country. And also that a north wind brings fair weather to us, as well as the east wind, which does not last so long as the north; therefore the north-east and south-west winds are those that are necessary chiefly to be treated of.

Some curious observers of the Weather have made this observation for many years; That there is as much south and west wind in eight years, as there are north and east winds, and of consequence as many wet years as dry ones.

Mr. Pointer gives the following rules to know when the wind will set in one of these two points, for the most part, for two or three months together.

First, as to the north-east wind: when the wind turns to the north-east point, and continues in it two days without rain, and does neither turn to the southward the third day, nor rain, then it is likely to continue eight or nine days without rain, and then to return into the south.

If the wind turn out of the south into the north-east again, and continue two days in that point, and neither rains nor turns to the south the third day, it is likely to continue north-east for two months, and for the most part for three months. The wind will finish these turns towards the north in three weeks time.

Secondly, as to the south-west winds: when the wind has been in the north for two months or more, and comes to the south, there are usually three or four fair days at first, and then on the fourth or fifth day comes rain, or else the wind turns north, and continues still dry. If within a day or two without rain, it return into the south, and with rain, turn northward, and return into the south the first or second day, as before, two or three times together after this manner; then it is like to be in the south or south-west two or three months together, for the most part, as it was in the north before.

He does not mention the east or west winds, because he says, the rains come usually from the south, or, in the shifting of the wind from the south to the north; as for the drought, the wind is, for the most part, north-east.

If it prove fair weather out of the south for a week together, which is not usual, it is like to be a great drought, when it has rained a long time out of the south before.

The wind usually turns from the north to the south quietly without rain, but comes back again into the north with a strong wind and rain.

The greatest winds, which blow down houses and trees, usually come by the turning of the wind out of the south by west into the north, which drives away rain, and clears the air.

Of Prognostications of the Weather from the barometer.

Dr. Derham presents us with the following remarks:

1. That foggy Weather makes the mercury rise in the barometer, as well as the north wind. The cause he suggests, probably enough, to be the accession of the load of vapour to the former weight of the atmosphere. Mizzling Weather he likewise observes to have the like effect.

2. The colds and heats in England and Switzerland begin and end nearly about the same time; nay, and any remarkable weather, especially if it continues any while, affects one place as well as the other.

3. That the remarkably cold days in June 1708, were found in Switzerland to precede ours commonly about five days or more; and that the remarkable heats in the following months begin to abate in both places about the same time, only somewhat sooner here than there.

4. That the winds in both places frequently agree, yet they sometimes differ.

5. That the barometer is always lower at Zurich than at Upminster, by sometimes one and sometimes two English inches; but the common difference is about half an inch, which may be solved either by supposing Zurich situate one fourth of an inch higher above the level of the sea than Upminster; or else by supposing that part of the terraqueous globe, as lying near the line, to be higher and more distant from the center than ours is, which lies nearer the pole.

6. That the barometer generally rises and falls together at far distant places, though this agreement of the barometer is not so constant between Zurich and Upminster, and places near home, viz. at London and Paris, where again the agreement of the barometer is not so great, as between Upminster and Lancashire.

7. That the variations of the barometer are greatest, as the places are nearest the poles. Thus, e. g. the mercury at London has a greater range by two or three lines than at Paris, and at Paris a greater than at Zurich; in some places near the equinoctial, there is scarce any variation at all.

8. That the rain in Switzerland and Italy is much greater in quantity throughout the year than that in Essex; yet the rains are more frequent, i. e. there are more rainy days in Essex, than at either of those places.

The proportion of the annual rains that fall in the several places we have any good observations of, stand thus: at Zurich the depth of the annual rain, at a medium, is about $32\frac{1}{2}$ inches; at Pisa $43\frac{1}{4}$; at Paris 23; at Lille in Flanders $23\frac{1}{2}$; at Townly in Lancashire $42\frac{1}{2}$; at Upminster $19\frac{1}{4}$.

9. That cold contributes greatly to rain, and that apparently, by condensing the suspended vapours, and making them descend. Thus very cold months or seasons are generally followed immediately by very rainy ones, and cold summers are always wet.

10. That high ridges of mountains, as the Alps, and the snows they are covered withal, not only affect the neighbouring places by the colds, rain, vapours, &c. they produce, but even distant countries, as England, often partake of their effects.—Thus the extraordinary colds, December 1708, and the relaxations thereof were felt in Italy and Switzerland several days before they reached us. This Dr. Derham thinks is an indication that they were driven from them to us.

WILDERNESSES, if rightly situated, artfully contrived, and judiciously planted, are very great ornaments to a fine garden; but it is rare to see these so well executed in gardens as could be wished, nor are they often judiciously situated; for they are frequently so situated as to hinder a distant prospect, or else are not judiciously planted; the latter of which is scarce ever to be found in any of our most magnificent gardens; very few of their designers ever studying the natural growth of trees so as to place them in such manner, that they may not obstruct the sight from the several parts of the plantation which are presented to the view; I shall therefore briefly set down what has occurred to me from time to time, when I have considered these parts of gardens, whereby a person will be capable to form an idea of the true beauties which ought always to be studied in the contrivance of Wildernesses.

1. Wildernesses should always be proportioned to the extent of the gardens in which they are made, that they may correspond in magnitude with the other parts of the garden; for it is very ridiculous to see a large Wilderness planted with tall trees in a small spot of ground; and on the other hand, nothing can be more absurd, than to see little paltry squares, or quarters of Wilderness work, in a magnificent large garden.

2. As to the situation of Wildernesses, they should never be placed too near the habitation, because the great quantity of moisture which is perspired from the trees will cause a damp unwholesome air about the house, which is often of ill consequence. Nor should

they be situated so as to obstruct any distant prospect of the country, which should always be preserved wherever it can be obtained, there being nothing so agreeable to the mind as an unconfined prospect of the adjacent country; but where the sight is confined within the limits of the garden from its situation, then there is nothing so agreeable as to terminate the prospect, as a beautiful scene of the various kinds of trees judiciously planted; and if it is so contrived, that the termination is planted circularly, with the concave toward the sight, it will have a much better effect, than if it end in strait lines or angles, which are never so agreeable to the mind.

3. The trees should always be adapted to the size of the plantation, for it is very absurd to see tall trees planted in small squares of a little garden; and so likewise, if in large designs are planted nothing but small shrubs, it will have a mean appearance. It should also be observed, never to plant evergreens amongst deciduous trees, but always place the evergreens in a Wilderness, or a separate part of the Wilderness by themselves, and that chiefly in sight, because these afford a continual pleasure both in summer and winter, when in the latter season the deciduous trees do not appear so agreeable; therefore, if the borders of Wilderness quarters are skirted with evergreens, they will have a good effect.

4. The walks must also be proportioned to the size of the ground, and not make large walks in a small Wilderness (nor too many walks, though smaller) whereby the greatest part of the ground is employed in walks; nor should the grand walks of a large Wilderness be too small, both of which are equally faulty. These walks should not be entered immediately from those of the pleasure-garden, but rather be led into by a small private walk, which will render it more entertaining; or if the large walk be turned in form of a serpent, so as not to shew its whole extent, the mind will be better pleased, than if the whole were to open to the view.

The old formal method of contriving Wildernesses was to divide the whole compass of ground, either into squares, angles, circles, or other figures, making the walks correspondent to them, planting the sides of the walks with hedges of Lime, Elm, Hornbeam, &c. and the quarters within were planted with various kinds of trees promiscuously without order; but this can by no means be esteemed a judicious method, because first hereby there will be a great expence in keeping the hedges of a large Wilderness in good order by shearing them, which, instead of being beautiful, are rather the reverse; for as these parts of a garden should, in a great measure, be designed from nature, whatever has the stiff appearance of art, does by no means correspond therewith; besides, these hedges are generally trained up so high, as to obstruct the sight from the stems of the tall trees in the quarters, which ought never to be done.

In the next place the walks are commonly made to intersect each other in angles, which also shew too formal and trite for such plantations, and are by no means comparable to such walks as have the appearance of meanders or labyrinths, where the eye cannot discover more than twenty or thirty yards in length; and the more these walks are turned, the greater pleasure they will afford. These should now and then lead into an open circular piece of Grass, in the center of which may be placed either an obelisk, statue, or fountain; and if in the middle part of the Wilderness there be contrived a large opening, in the center of which may be erected a dome or banqueting-house surrounded with a green plat of Grass, it will be a considerable addition to the beauty of the place.

From the sides of the walks and openings, the trees should rise gradually one above another to the middle of the quarters, where should always be planted the largest growing trees, so that the heads of all the trees will appear to view, but their stems will be hid, which will have a vastly different effect from the common method, where the trees are planted large and small

without order; so that many times the largest are next the sight, and small ones behind them, just according as it happens, in which manner the small ones, being overhung and shaded, seldom thrive well.

But in order to plant a Wilderness with judgment, the usual growth of all the different sorts of trees should be well considered, that each may be placed according to the magnitude to which they generally arrive; otherwise, if they are at first planted one above another, as before directed, they will not continue to grow in this order many years; for some sorts will greatly outgrow the others, and thereby render the plantation less beautiful; but when they are placed according to their usual manner of growing, they will always continue nearly in the same order, which renders them very entertaining to the sight.

These trees should also be allowed a proportionable distance, according to their growth, and not be crowded so close as is commonly practised, whereby there are four times the number of trees planted which need be; and this close planting causes them to aspire to a great height, but then they want the noble diffusion of branches, which is vastly more agreeable to the sight, than a parcel of thin taper stems, with scarcely any heads, as is too often the case in some of the largest gardens in England, where, instead of looking at a noble parabola of trees, with their spreading globular heads, a parcel of naked stems present themselves to view; and where the trees are thus crowded, they never thrive half so well, nor will they continue half so long, as those which are allowed a proper distance; for their roots running and interfering with each other, draw the nourishment away faster than the ground can supply them, which causes their leaves to be small, and, in dry seasons, to decay and fall off, long before their usual time, and thereby renders the plantation less agreeable.

In the distribution of these plantations, in those parts which are planted with deciduous trees, there may be planted next the walks and openings, Roses, Honey-suckles, *Spiræa Frutex*, and other kinds of low-flowering shrubs, which may be always kept very dwarf, and may be planted pretty close together; and at the foot of them, near the sides of the walks, may be planted Primroses, Violets, Daffodils, and many other sorts of wood flowers, not in a strait line, but rather to appear accidental, as in a natural wood. Behind the first row of shrubs should be planted Syringas, *Cytisuses*, *Althæa frutex*, *Mezereons*, and other flowering shrubs of a middle growth, which may be backed with Laburnums, Lilacs, Guelder Roses, and other flowering shrubs of a large growth: these may be backed with many other sorts of trees, rising gradually to the middle of the quarters, from whence they should always slope down every way to the walks.

By this distribution you will have the pleasure of the flowering shrubs near the sight, whereby you will be regaled with their scent as you pass through the walks, which is seldom observed by those who plant Wildernesses; for nothing is more common than to see Roses, Honey-suckles, and other small flowering shrubs, placed in the middle of large quarters, under the dropping and shade of large trees, where they seldom thrive; and if they do, the pleasure of them is lost, because they are secluded from the sight. If these quarters are slightly dug every winter, it will keep the ground clean from noxious weeds, and be a great benefit to the trees. And the expence of doing this, where labour is cheap, cannot be very considerable, unless in very great plantations.

But, beside these grand walks and openings, (which may be laid with turf, and kept well mowed) there should be some smaller serpentine walks through the middle of the quarters, where persons may retire for privacy. There need be nothing but the ground of the place made level, and kept hoed, to clear it from weeds, which will be no great trouble to do with a Dutch hoe, which is broad, and will make great rid-
dance, and then rake them over to make them hand-

some. These walks need not be very broad, but should be turned in such a manner, as not to deviate far from the middle of the quarter, because there the trees, being largest, will afford the amplest shade. Five or six feet will be a sufficient width for these walks in large quarters, but in small ones four feet is full enough. By the sides of these private walks may also be scattered some wood-flowers and plants, which, if artfully planted, will have a very good effect.

In the general design for these Wildernesses it should not be studied to make the several parts correspondent, for that is so formal and stiff, as to be now quite rejected. The greater diversity there is in the distribution of these parts, the more pleasure they will afford; and since, according to this method of designing and planting, the different parts never present themselves to the same views, it is no matter how different they are varied asunder; that part of them which is most in view from the house, or other parts of the garden, may be planted with evergreens, but the other parts may be planted with deciduous trees in the foregoing manner.

The part planted with evergreens may be disposed in the following manner, viz. in the first line next the great walks may be placed *Laurustinus*, Boxes, Spurge Laurel, Juniper, Savin, and other dwarf evergreens; behind these may be planted Laurels, Hollies, *Arbutuses*, and other evergreens of a larger growth; next to these may be placed *Alaternuses*, *Phyllireas*, Yews, Cypresses, Virginian Cedars, and other trees of the same growth; behind these may be planted Norway and Silver Firs, the True Pine, and other sorts of the like growth; and in the middle should be planted Scotch Pines, *Pinaster*, and other of the largest growing evergreens, which will afford a most delightful prospect, if the different shades of their greens are curiously intermixed. And in order to render the variety greater, there may be several kinds of hardy evergreen trees and shrubs obtained from the north parts of America, as there are already many in England, which are very fit for this purpose, and are mentioned in different parts of this book.

This manner of separating the evergreens from the deciduous trees, will not only make a much better appearance, but also cause them to thrive far beyond what they usually do when intermixed; therefore I should never advise any person to plant them promiscuously together.

By what I have said concerning the planting the trees one behind another, according to their different growths, I would not have it understood, that I mean the placing them in strait lines, which is too stiff and formal for these plantations; all that is intended is, to place the front rows of trees on each side the walks, at an equal distance from the side of the walks, which being twisted in easy natural turns, the shrubs having the curves will stand in the same direction, and must turn in the same manner as the walks. Those behind may be placed after any manner, provided care be taken to allow each sufficient room to grow, and that there may appear no uneven gaps in the distance of their heads, but that they may all rise gradually, so as to form a handsome slope.

In small gardens, where there is not room for these magnificent Wildernesses, there may be some rising clumps of evergreens, so designed as to make the ground appear much larger than it is in reality; and if in these there are some serpentine walks well contrived, it will greatly improve the places, and deceive those who are unacquainted with the ground as to its size. These clumps or little quarters of evergreens should be placed just beyond the plain opening of Grass before the house, where the eye will be carried from the plain surface of Grass to the regular slope of evergreens, to the great pleasure of the beholder; but if there is a distant prospect of the adjacent country from the house, then this should not be obstructed, but rather be left open for the prospect bounded on each side with these clumps, which may be extended to those parts of the ground, where no view is ob-
structed.

fructed. These small quarters should not be surrounded with hedges, for the reasons before given; nor should they be cut into angles, or any other studied figures, but be designed rather in a rural manner, which is always preferable to the other, for these kinds of plantations.

In Wilderesses there is but little trouble or expence after their first planting, which is an addition to their value; the only labour required is to mow and roll the large Grass walks, and to keep the other ground walks free from weeds. And in the quarters, if the weeds are hoed down two or three times in a summer, it will still add to their neatness. The trees should also be pruned to cut out all dead wood, or irregular branches, where they cross each other, and just to preserve them within due bounds; and as was before observed, if the ground be slightly dug between the trees, it will greatly promote their vigour. This being the whole labour of a Wilderess, it is no wonder they are so generally esteemed, especially when we consider the pleasure they afford.

SWEET WILLIAM. See DIANTHUS.

WILLOW. See SALIX.

WILLOW, the French. See EPILOBIUM.

WIND is defined to be the stream or current of the air, together with such vapours as the air carries along with it; or it is a sensible agitation of the air, whereby a large quantity thereof flows out of one place or region to another.

The ancients made but four Winds, according to the four cardinal points, but this was quickly looked upon as too gross a division. The following age added eight more to this number, which was thought too nice a subdividing, and therefore they reduced the last number to four, taking every other or middle Wind; and adding them to the old account; but our sailors, who are far beyond the ancients for their skill in navigation, have divided the horizon into thirty-two equal parts, adding twenty-eight to the four cardinal Winds; a thing useful in navigation, but of no great concern in natural philosophy, unless it be to give a hint, that the Wind blows from all parts of the heavens.

As to the physical cause of the Winds;

Some philosophers, as Des Cartes, Rohault, &c. account for the general Wind from the diurnal rotation of the earth, and from this general Wind derive all the particular ones.

They say, the atmosphere investing the earth, and moving round it, that part will perform its circuit soonest, which has the smallest circle to describe. The air therefore, near the equator, will require a somewhat longer time to perform its course in from west to east than nearer the poles; that as the earth turns eastward, the particles of the air near the equinoctial being exceeding light, are left behind, so that in respect to the earth's surface, they move westward, and become a constant easterly Wind.

This opinion seems confirmed, for that these Winds are found only near the equinoctial, in those parallels of latitude, where the diurnal motion is swiftest, but the constant calms of the Atlantic sea, near the equator, the westerly Winds near the coast of Guiney, and the periodical westerly Monsoons, under the equator of the Indian sea, seemingly declare the insufficiency of that hypothesis.

Besides, the air, being kept to the earth by the principle of gravity, would in time acquire the same degree of velocity, that the earth's surface moves with, as well in respect of the diurnal rotation, as of the annual about the sun, which is about thirty minutes swifter.

It remains therefore to substitute some other cause, capable of producing a like constant effect; not liable to the same objections, but agreeable to the known properties of the elements of air and water, and the laws of the motion of fluid bodies; such an one is the action of the sun's beams upon the air and water,

as he passes every day over the oceans, considered together with the nature of the soil and situation of the adjoining continents. This has been done by Dr. Halley.

Therefore, according to the laws of statics, the air, which is less rarefied or expanded by heat, and consequently more ponderous, must have a motion towards those parts thereof which are more rarefied, and less ponderous, to bring it to an equilibrium. Also the presence of the sun continually shifting to the westward, that part to which the air tends, by reason of the rarefaction made by his greatest meridian heat, is with him carried westward; and consequently, the tendency of the whole body of the lower air is that way.

Thus a general easterly Wind is formed; which being impressed upon all the air of a vast ocean, the parts impel one the other, and so keep moving till the next return of the sun; whereby so much of the motion as was lost, is again restored, and thus the easterly Wind is made perpetual.

From the same principle it follows, that the easterly Wind should, on the north side of the equator, be to the northward of the east; and in south latitudes, to the southward thereof; for near the line the air is much more rarefied, than at a greater distance from it; because the sun is twice in a year vertical there, and at no time distant above twenty-three degrees one half; at which distance the heat being at the sine of the angle of incidence, is but little short of that of the perpendicular ray; whereas, under the tropics, tho' the sun stay long vertical, yet he is a long forty-seven degrees off; which is a kind of winter, wherein the air so cools, as that the summer heat cannot warm it to the same degree with that under the equator. Wherefore the air towards the northward and southward being less rarefied than that in the middle, it follows, that from both sides it ought to tend towards the equator. This motion, compounded with the former easterly Wind, answers all the phenomena of the general trade Winds; which, if the whole surface of the globe were sea, would undoubtedly blow all round the world, as they are found to do in the Atlantic and Ethiopic oceans.

But seeing so great continents interpose, and break the continuity of the oceans, regard must be had to the nature of the soil, and the position of the high mountains, which are the two principal causes of the several variations of the Wind from the former general rule; for if a country, lying near the sun, prove to be flat, sandy, and low land, such as the deserts of Lybia are usually reported to be, the heat occasioned by the reflection of the sun's beams, and the retention thereof in the sand, is incredible to those who have not felt it; whereby the air being exceedingly rarefied, it is necessary, that this cooler and more dense air should run thitherwards to restore the equilibrium.

This is supposed to be the cause, why, near the coast of Guiney, the Wind always sets in upon the land, blowing westerly instead of easterly; there being sufficient reason to believe, that the inland parts of Africa are prodigiously hot, since the northern borders thereof were so intemperate, as to give the ancients cause to conclude, that all beyond the tropics was uninhabitable by excess of heat.

From the same cause it happens, that there are so constant calms in that part of the ocean called the Rains; for this tract being placed in the middle, between the westerly Winds blowing on the coast of Guiney, and the easterly trade Winds blowing to the westward thereof, the tendency of the air here is indifferent to either, and so stands in æquilibrium between both; and the weight of the incumbent atmosphere being diminished by the continual contrary Winds blowing from hence, is the reason that the air here holds not the copious vapour it receives, but lets it fall in frequent rains.

But as the cool and dense air, by reason of the greater gravity, presses upon the hot rarefied, it is demonstrative,

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strative, that this latter must ascend in a continual stream as fast as it rarefies; and that being ascended, it must disperse itself to preserve the equilibrium, that is, by a contrary current the upper air must move from those parts where the greatest heat is; so, by a kind of circulation, the north-east trade Wind below will be attended with a south-westerly above. That this is more than a bare conjecture, the almost instantaneous change of the Wind to the opposite point, which is frequently found in passing the limits of the trade Winds, seems to assure us; but that which above all confirms this hypothesis, is the phenomenon of the Monsoons, by this means most easily solved, and without it hardly explicable.

Supposing therefore, such a circulation as above, it is to be considered, that to the northward of the Indian ocean, there is every where land within the usual limits of the latitude of thirty degrees; viz. Arabia, Persia, India, &c. which for the same reason as the mediterranean parts of Africa, are subject to unsufferable heats, when the sun is in the north, passing nearly vertical; but yet are temperate enough, when the sun is removed toward the other tropic, because of a ridge of mountains at some distance within the land, said to be frequently in winter covered with snow, over which the air, as it passes, must needs be much chilled.

Hence it comes to pass, that the air, coming according to the general rule, out of the north-east in the Indian sea, is sometimes hotter, sometimes colder, than that which by this circulation is returned out of the south-west; and by consequence, sometimes the under current or Wind is from the north-east, sometimes from the south-west.

That this has no other cause, is clear from the times wherein these Winds set, viz. in April, when the sun begins to warm those countries to the north, the south-west Monsoons begin, and blow during the heat till October; when the sun being retired, and all things growing cooler northward, and the heat increasing to the south, the north-east enter and blow all the winter, till April again. And it is undoubtedly from the same principle, that southward of the equator, in part of the Indian ocean, the north-east Winds succeed the south-east, when the sun draws near the tropic of Capricorn.

But in this latter occurs a difficulty not well to be accounted for, which is, why this change of the Monsoons should be any more in this ocean, than in the same latitudes in the Æthiopic, where there is nothing more certain than a south-east Wind all the year.

It is likewise very hard to conceive, why the limits of the trade Winds should be fixed about the thirtieth degree of latitude all round the globe; and that they should so seldom transgress or fall short of those bounds; as also that in the Indian sea, only the northern part should be subject to the changeable Monsoons, and in the southern there should be a constant south-east.

This account of Wind is taken from the learned Dr. Halley's discourse on this subject, Philosoph. Trans. N° 183.

The Rev. Mr. Robinson gives this account of the origin of Wind; that in the greatest probability it proceeds from vast swarms of nitrous particles, which rise from the bottom of the sea, and have been put into motion, either by the central fire, or by that heat and fermentation which abounds in this huge body of the earth; and therefore this first commotion, which is excited by the said fermentation, is called a bottom Wind, which is presently discovered by the porpoises, and other sea fish, that delight to sport and play upon the waves of the sea, and by their playing, give to the mariners the first notice of an approaching storm.

When these nitrous swarms are risen toward the surface of the sea, they cause, in a dark night, such a shining light upon the waves, as if the sea were on fire; and being delivered from the brackish water,

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and received into the open air, those fiery and shining meteors, which fix upon masts and sides of the ships, are only nitrous particles condensed by the circumambient cold, and like that which the chemists call phosphorus, or artificial glow-worm; shine and cast a light, but have no heat.

This gives the second notice to the mariners, that the storm is rising; for the sea begins to be rough upon the first breaking out of the Wind, and the waves swell and rise, though the air at the same time is calm and clear.

This boiling fermentation of the sea causes the vapours to arise, which by the intenseness of the circumambient cold, are condensed into thick clouds, and fall down in storms of Wind and rain; first upon the sea, from whence they rose; and then the attractive power of the mountain cold, by a secret magnetism between vapour and cold, attracts the watery vapours, and intermixed with nitrous particles, they ascend to the high tops of mountains and hills, where they hang hovering in thick fogs, and watery mists, until the atmospherical heat rarefies the nitrous part of the fog, which is almost uppermost, and appears white and translucent, into brisk gales of Wind.

And the intenseness of the atmospherical cold having attracted the vapours into the colder regions of the air, where they are condensed into clouds, the Wind breaks, dissipates, and drives them before it, till they fall down in rain, and water the surface of the earth.

And this seems to be the reason why they have but little Wind, and less rain in Egypt, and those level countries where they have no mountains.

Dr. Derham says, Wind is a current of the air; and that which excites or alters its current, may justly be said to be the cause of Wind.

An equipoise of the atmosphere produces a calm; but if that equipoise be taken off, more or less, a stream of air or Wind is accordingly thereby produced, either stronger or weaker, swifter or slower.

And there are divers things that may cause such alterations in the equipoise or balance of the atmosphere, viz. eruptions of vapours from the sea and land, rarefactions and condensations in one place more than in another, the falling of rain, pressure of the clouds, &c.

It is observed of caves, that they always emit Winds more or less; and as great caves, so great lakes also send forth Winds; but the most universal and constant alterations of the atmosphere are produced by heat and cold.

This is manifest in the general trade Winds, which, between the tropics, blow all the year from east to west; if the cause of this be (according to the opinion of some ingenious men) the daily progress of the sun round that part of the globe, and by his heat rarefying one part of the air, while the cooler and heavier air behind presses after.

And so the land and sea breezes; and so in our climate, the northerly and southerly Winds (which are commonly esteemed the cause of warm and cold weather) are really the effects of the cold or warmth of the atmosphere.

Of this Dr. Derham says, he has had so many confirmations, that he does not doubt of it; and he produces for an instance of it, that it is not uncommon to see a warm southerly Wind, on a sudden change to the north, by the fall of snow or hail; and in a cold frosty morning, to see the Wind north, and to wheel about toward the southerly quarters, when the sun has well warmed the air; and then again, in the cold evening, to turn northerly or easterly.

And hence also it is, that the Winds and clouds are oftentimes contrary to each other in thunder showers (especially if hail falls;) the sultry weather below directs the Wind one way, and the cold above the clouds another way.

And that he has observed several times, that when the morning has been warm, and what Wind was stirring was west-south-west, that the clouds were thick

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thick and black (as they generally are when snow follows;) and that, a little before noon, the Wind veered about to the north by west, and sometimes to other points; the clouds at the same time flying some north by west, and some south-west; that about one o'clock it rained apace, the clouds sometimes flying north-east, then north; and at last both Winds and clouds have settled north by west; and at that time the fleet fell very plentifully, and it grew very cold.

From all which he observes;

First, that though the region below was warm, the region of the clouds was cold, as the black snowy clouds shewed.

Secondly, That the struggle between the warmth of our region, and the cold of the cloudy region stopped the airy currents of both regions.

Thirdly, That the falling of the snow through our warmer air, did at first melt into rain; but after the superior cold had conquered the inferior warmth, it became fleet.

Fourthly, That as the cold prevailed by degrees, it wheeled about both the Winds and clouds, from the northward towards the south.

It is not at all improbable, that there is often assembled in the atmosphere, a sufficient quantity of vapours to maintain a lasting condensation; and that it is also quick enough at some times to create a great Wind.

For according to Dr. Halley's experiment, it may be computed, that there is 129,762,219 cubical miles of the atmosphere filled by vapours every day. This prodigious quantity, being divided and ranged in bodies at various situations throughout the world, occasions, by the mutual condensations, almost constant results of the air, to supply the empty places; so may be thought abundantly sufficient for producing and maintaining all Winds universally.

From these and other considerations, it may be concluded, that the production of Winds depends chiefly on the condensation of vapours; and in order to confirm this hypothesis, we shall proceed to explain several properties and cases solvable thereby:

1. That the direction or course of any Wind is according to the situation of the body of vapours, whose condensation produces it; so if a concourse of vapours be gathered over the kingdom of France, the condensation thereof would draw the air from England in a southerly direction, in Spain would be a northerly Wind, in Germany would blow westerly, at the Bay of Biscay an easterly Wind.

2. That the force or intensity of a Wind is the extension of the condensing vapour, and the quickness of their condensations.

3. This may account for there being more Winds about the equinoxes than at other seasons.

4. We must add that it is understood, that the greater quantities of rain that fall in the winter, must occasion more Winds than in summer, there being a proportionable quantity of vapours condensed; and likewise,

5. That there are more Winds in distant latitudes than toward the equator; because the former are more subject to rain.

6. Why there is more rain and Wind in the winter than in the summer, when the heat of the sun is in the former more weak and languid, by which it is incapable of raising any great quantity of vapour to produce that rain and Wind.

7. Why they have more rain and Wind toward the poles and about the equator, although the latter is a part of the world where the sun makes the greatest evaporation.

The industry of some late writers have brought the theory and production, and motion of the Winds, to somewhat of mathematical demonstration, we shall here give it to the reader in that form.

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Laws of the production, &c. of Winds.

1. If the spring of the air be weakened in any place, more than in the adjoining places, a Wind will blow through the place where the diminution is.

For since the air endeavours by its elastic force to expand itself every way, if that force be less in one place than another, the nifus of the more against the less elastic will be greater, than the nifus of the latter against the former.—The less elastic air, therefore, will resist with less force than it is urged by the more elastic; consequently, the less elastic will be driven out of its place, and the more elastic will succeed.

If now the excess of the spring of the more elastic, to that of the less elastic, be such as to occasion a little alteration in the baroscope, the motion both of the air expelled, and that which succeeds it will become sensible.

2. Hence, since the spring of the air increases, as the compressing weight increases, and compressed air is denser than air less compressed, all Winds blow into a rarer air out of a place filled with a denser.

3. Wherefore since a denser air is specifically heavier than a rarer, an extraordinary lightness of the air in any place, must be attended with extraordinary Winds or storms.

Now an extraordinary fall of the mercury in the barometer, shews an extraordinary lightness of the atmosphere; therefore it is no wonder if that foretels storms.

4. If the air be suddenly condensed in any place, its spring will be suddenly diminished; hence, if this diminution be great enough to affect the barometer, there will be a Wind blow through the condensed air.

5. But since it cannot be suddenly condensed, unless it has before been much rarefied, there will a Wind blow through the air as it cools, after it is violently heated.

6. In like manner if air be suddenly rarefied, its spring is suddenly increased; wherefore it will flow through the contiguous air, not acted on by the rarefying force.—A Wind therefore will blow out of a place in which the air is suddenly rarefied; and on this principle it is, in all probability, that

7. Most caves are found to emit Wind, either more or less.—Since the sun's power in rarefying the air is notorious, it must necessarily have a great influence on the generation of Winds.

The rising and changing of the Wind is determined experimentally, by means of weather-cocks placed on the tops of houses, &c.—But these only indicate what passes about their own height, or near the surface of the earth; Wolfius assuring us, from observations of several years, that the higher Winds which drive the clouds, are different from the lower ones, which move the weather-cocks.

Dr. Derham observes, upon comparing several series of observations made of the Winds in divers countries, viz. England, Ireland, Switzerland, Italy, France, New England, &c. that the Winds in those several places seldom agree; but when they do, it is commonly when they are strong, and of long continuance in the same quarter; and more, he thinks, in the northerly and easterly, than in any other points.—Also, that a strong Wind in one place is oftentimes a weak one in another; or moderate, according as the places are nearer or more remote.

The laws of the force and velocity of Wind.

Wind being only air in motion, and air a fluid subject to the laws of other fluids, its force may be brought to a precise computation: thus;

The ratio of the specific gravity of any other fluid to that of the air, together with the space that fluid, impelled by the pressure of the air, moves in any given time, being given; we can determine the space

which the air itself, acted on by the same force, will move in the same time by this rule.

1. As the specific gravity of air is to that of any other fluid, so reciprocally is the square of the space which that fluid, impelled by any force, moves in any given time, to the square of the space, which the air, by the same impulse, will move in the same time.

Supposing therefore, the ratio of the specific gravity of that other fluid to that of air, to be $=b:c$; the space described by the fluid to be called f ; and that which the air will describe by the same impulse x : the rule gives us $x=\sqrt{bs:c}$.

Hence, if we suppose water, impelled by the given force, to move two feet in a second of time; then will $f=2$; and since the specific gravity of water to air is as 970 to 1, we shall have $b=970$, and $c=1$; consequently $x=\sqrt{970}$. $4=\sqrt{3880}=632$ feet: the velocity of the Wind, therefore to that of water, moved by the same power, will be as 623 to 2; i. e. if water move two feet in a second, the Wind will fly 623 feet.

2. Add, that $f=\sqrt{cx^2:b}$; and therefore the space any fluid, impelled by any impression, moves in any time, is determined by finding a fourth proportional to the two numbers that express the ratio of the specific gravity, and the square of the space the Wind moves in the given time. The square root of that fourth proportional is the space required.

M. Mariotte, e. g. found, by various experiments, that a pretty strong Wind moves 24 feet in a second of time; wherefore, if the space which the water, acted on by the same force as the air, will describe in the same time, be required, then will $c=1$, $x=24$, $b=970$, and we shall find $f=\sqrt{576:970}=\frac{24}{\sqrt{31}}$.

3. The velocity of Wind being given, to determine the pressure required to produce that velocity, we have this rule:

The space the Wind moves in one second of time, is to the height a fluid is to be raised in an empty tube, in order to have a pressure capable of producing that velocity, in a ratio compounded of the specific gravity of the fluid to that of air; and of quadruple the altitude a body descends in the first second of time, to the aforesaid space of air.

Suppose, e. gr. the space the air moves in a second $a=24$ feet, or 288 inches; call the altitude of the third x , and the ratio of the mercury to the air $b:c=13580:1$, $d=181$ inches; x will be less than the number by one line, or $\frac{1}{12}$ of an inch. And hence we see why a small, but sudden change in the barometer, should be followed by violent Winds.

The force of the Wind is determined experimentally, by a peculiar machine called an anemometer, or Wind measurer; which being moved by means of sails, like those of a Windmill, raise a weight, that still the higher it is raised, receding farther from the center of motion, by sliding along a hollow arm fitted on to the axis of the sails, becomes heavier and heavier, and presses on the arm, till, being a counterpoise to the force of the Wind on the sails, it stops the motion of them. An index then, fitted upon the same axis, at right angles with the arm, by its rising or falling, points out the strength of the Wind, on a plane divided like a dial plate into degrees.

Winds are either constant or variable. The constant Winds are up and down always at a certain time of the year, and in certain parts of the world; but the variable vary so much, that they cannot be reduced to any rule.

The constant and periodical Winds are only in the widest seas; as in the Atlantic and Ethiopic seas, between the tropics, there is generally an easterly Wind all the year long, without any considerable variation, unless declining some few points toward the north or south; but all along the coasts of Guiney, for five hundred leagues, the southerly and south-west Winds are perpetual.

In the Indian ocean the Winds are partly general, as in the Ethiopic ocean, and partly periodical; that is,

they blow one way half the year, and upon the opposite points the other half.

This that is here said relates to the sea Winds, at some distance from the land; for upon the land, and near the shores, the land and sea breezes are almost every where sensible; and the great variety that happens in their periods, force, and direction, happens from the situation of mountains, valleys, and woods, and from the various texture of the soil, more or less capable of retaining or reflecting heat, or of exhaling or condensing vapours.

Of variable Winds, some are common to all countries, others are more peculiar to some certain parts.

Of the latter sort, the most famous are hurricanes, which chiefly infest the Caribbee islands, but are not anniversary, nor equally frequent.

Their fury is so great, that they throw down all before them, tear up trees, overturn houses, toss ships prodigiously, and blow about things of a vast weight. They are not even continued Winds, but blow in gusts, which suddenly come and go; neither do they extend very wide, but are sometimes confined to a narrow compass, and at other times take a larger scope. As for their duration, it is but a few days, and sometimes only for a few hours. They are more common in America than any where else, but yet Europe and Asia are not altogether without them, as appears from histories and travels.

The causes of tempests and hurricanes are hardly to be accounted for in all particulars. However it may, in the first place be noted, that the ratio of all liquids is much the same, and therefore an extraordinary motion may be excited in the air, by the same way as in water.

Now, if water fall from a high place, or if there be a confluence of several streams together, this gives a violent motion, and causes a many whirlings and eddies in it. This is apparent in the torrents falling down the rocks, and the confluence of rivers.

If therefore something analogous may happen in the air, there needs must be furious tempests of Wind raised in it. And such a thing may happen, if any extraordinary quantity of vapours be drawn by the Wind, upon a certain place, which they cannot easily get over, by reason of mountains or contrary Winds, which oppose them: for example; suppose a Wind, upon some point between north and east, carries a large collection of vapours out of Africa into the Caribbee islands; this Wind lights upon the continent of America; now, it is possible, that not only the mountains and woods of Panama may resist the current of this Wind, and crowd the vapours together there; but a contrary Wind, upon a point between south and west, may blow at the same time upon the western shore of America, which shall force the vapours back again. When such a rencounter happens, there must be a wild uproar in the air about the Caribbee islands, and in all that tract between South and North America, and the vapours in this circular motion must needs be furious on all sides, just as it is in the water.

For we see in the confluence of two rivers, if their currents are rapid at the place where they fall in, they cause violent eddies, whirl things about that are cast in them, swallowing them up for a little time, and then throwing them back again.

This shews us the reason, why heavy bodies are often tossed in the air by the whirling of hurricanes, and then dashed to the ground again; for the air being a circular motion, is with great fury tossed backwards and forwards, between the ground and the clouds; for as the waters of the rolling sea do not run to the shores in an even stream, but in such waves as dash by fits and turns; so the course of a violent Wind is in broken and distinct blasts.

Such tempests do not extend very far, though their bounds are uncertain, because the neighbouring air giving way to them, they spend themselves in the progress of their motion.

Thus,

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Thus, when a great stone is cast into the water, we see a great agitation round about the place where it fell; but the more the waves retire from the center of motion, the slower and the less sensible they grow; and as such motions do not last long in water, no more do they in the air, for the same reason.

Though there may be unusual storms of Wind any where, the air and vapours are drawn together thereabout by contrary Winds, yet they are more frequent about the Caribbee islands, especially in June and August, when the sun is vertical there, for their air being rarefied by the sun's heat, the usual Winds bring thither a vast quantity of air and vapours, which being crowded together, in the gulf of America, cause a great estimation about the neighbouring islands.

When the sun is on this side the equator, the air is more rarefied thereabouts, and it may so happen, that the south-south-east Wind, which constantly blows beyond the line, may sometimes transgress its limits, and bring the vapours of the Æthiopic sea to the same place where those of the Atlantic are already gathered; which, being kept in by the shore of America, must necessarily be driven about the Caribbee islands.

Of the qualities of Winds.

1. A Wind that blows from the sea is always moist; in summer it is cold, in winter warm, unless the sea be frozen up. This is well demonstrated thus: there is vapour continually rising out of all water (as appears even hence, that a quantity of water, being left a little while in an open vessel, is found sensibly diminished,) but especially if it be exposed to the sun's rays, in which case the evaporation is beyond all expectation. By this means the air incumbent on the sea becomes impregnated with a deal of vapour, but the Winds, blowing from off the sea, sweep these vapours along with them, and consequently are always moist.

Again, water in summer, &c. conceives less heat than terrestrial bodies, exposed to the same rays of the sun; but in winter, sea water is warmer than the earth, covered with frost, snow, &c. Wherefore, as the air, contiguous to any body, is found to partake of its heat and cold; the air, contiguous to sea water, will be warmer in winter, and colder in summer, than that contiguous to the earth: or thus; vapours raised from water by the sun's warmth in winter, are warmer than the air they rise in, as appears from the vapours condensing, and become visible, almost as soon as they are got out into the air. Fresh quantities of vapours therefore, continually warming the atmosphere over the sea, will raise its heat beyond that over the land.

Again, the sun's rays reflected from the earth into the air in summer, are much more than those from the water into the air. The air therefore over the earth, warmed by the reflection of more rays than that over water, is warmer. Hence sea Winds make cloudy hazy weather.

2. Winds which blow from the continent are always dry, in summer warm, and cold in winter; for there is much less vapour arising from the earth, than from water, and therefore the air over the continent will be impregnated with much fewer vapours: add, that the vapours or exhalations raised by a great degree of heat out of the earth, are much finer and less sensible than those from water. The Wind therefore, blowing over the continent, carries but little vapour with it, and is therefore dry.

Our northern and southern Winds, however, which are commonly esteemed the causes of cold and warm weather, Dr. Derham observes (as we have said,) are really the effects of the cold or warmth of the atmosphere: hence it is, that we frequently see a warm southerly Wind on a sudden changed to the north, by the fall of snow or hail, and that in a cold frosty morning we see the Wind north, which afterward wheels about toward the southerly quarters, when the

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sun has well warmed the air, and again in the cold evening turns northerly or easterly.

Some Winds are drying, others are moist; some gather clouds, others disperse them; some are warm; others cold, but their influence is not one and the same in all places, for such Winds as are warm in one country are cold in another; those that are wet with us are dry with other nations, and on the contrary.

The dry Winds are such as carry but a few vapours along with them, and therefore lick off the moist particles from the bodies over which they pass; and thus in Holland the north and east Winds, with the intermediate points, are drying, because the cold northern sea yields but few vapours in comparison of those that come from warmer parts of the ocean, but the westerly Winds and others are moist, because they issue from warm and vaporous parts, the western Wind seldom failing to send rain.

Such Winds gather clouds, which blow from the quarters where the vapours arise, which, in conjunction with the vapours of our own region, fill the air; and, on the contrary, those that bring little vapours along with them, and bear away that which hangs over us, bring fair weather.

Winds are either warm or cold, as the countries are from whence they blow; and therefore when a brisk wind blows from a cold quarter, it allays the heat of summer, which is very troublesome in still weather. Thus a quick blast of a pair of bellows will put out a flame, which a gentle blowing increases; for the quick blast drives all the flame to one side, where it is stifled by the force of the incumbent air for want of aliment; but a gentle wind augments the motion of the flame every way, and makes it seize on more parts of fuel.

Now, because all the heat or cold of Wind proceeds from the heat or cold of the country where it blows, therefore the same Winds are cold or hot every where. Beyond the line they are just the reverse of what they are with us; their cold Winds are from the south, ours from the north; and as our south Winds are warm, from no other reason, but because they bring us an air heated by the sun, for the very same reason the north Winds are warm to our antipodes.

From what has been said, it is evident, that the sun is the cause of the Wind, and motion the cause of vapours:

Prognostics of weather from the Wind.

The Winds, Mr. Pointer says, are the causes of the most sudden and extraordinary alterations of the air.

The nature of the Winds are such, that by the experience we have of them, we may very nearly predict what weather we shall have for two or three days after; as for example, we know that, in our climate, a south Wind generally brings rain, and a west Wind more; and a west Wind is the predominant Wind with us, because the ocean lies on the west side of our country.

And also, that a north Wind brings fair weather to us, as well as the east Wind, which does not last so long as the north; therefore the north-east and south-west Winds are those that are necessary chiefly to be treated of.

Mr. Pointer gives the following rules to know when the Wind will set in one of these two points, for the most part, for two or three months together. First, as to the north-east Wind; when the Wind turns to the north-east point, and continues in it two days without rain, and does neither turn to the southward the third day, nor rain, then it is likely to continue eight or nine days without rain, and then to return into the south. If this Wind turns out of the south to the north-east again, and continues two days in that point without rain, and neither rains nor turns to the south the third day, it is likely to continue north-east for two months, and for the most part for three months. The Wind will finish these turns toward the north in three weeks time.

Secondly,

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Secondly, as to the south-west Winds; when the Wind has been in the north for two months or more, and comes to the south, there are usually three or four fair days at first, and then, on the fourth or fifth day comes rain, or else the Wind turns north, and continues dry still; if within a day or two, without rain, it return to the south, and with rain turn northward, and return into the south the first or second day, as before, two or three times together after this manner, then it is like to be in the south or south-west two or three months together, for the most part, as it was in the north before. The Wind will finish these turns in a fortnight.

He does not mention the east or west Winds, because he says, the rains usually come from the south, or in shifting of the Wind from the south to the north; as for the drought, the Wind is, for the most part, north-east.

The Wind usually turns from the north to the south quietly without rain; but comes back again into the north, with a strong Wind and rain. The greatest Winds which blow down houses and trees, usually come by the turning of the Wind out of the south by the west into the north, which drives away rain, and clears the air.

Signs of the changing of the Wind.

Mr. Pointer says, in what point soever the Wind is, when the sun rises with many pale spots appearing in its orb, and part of it hid in a cloud, it will soon turn to the south.

That when the Wind has been settled for twenty-four hours or more, in any of the full points, as north, east, west, or south, when it begins to turn, it will not settle till it comes to the opposite point, as from the north to the south, and so from full east to full west; and so of the angular points as from the north-east, to the south-west.

Upon whatsoever quarter the Wind is when the moon changes, it presently changes upon the new moon.

When the generality of the clouds tack with the Wind (though there should be many little fleeces, or long flakes, lying higher) the Wind is flagging, and will change soon, and shift its point.

Common observations and signs of Winds and storms arising.

If pale spots seem to appear in the orb of the sun at his setting, and dazzle there, strong Winds from the south will ensue; the Wind soon shifting into that point, in what quarter soever it was before.

If there appear upon the sun when he is setting, fiery spots, or of a reddish colour, much Wind will ensue; and a lowering morning is frequently a fore-runner of Wind.

If the moon, when at full, has a reddish circle about her, it presages much Wind.

When meteors, or as they are commonly called, stars, shoot, and spread a long train of light, they are fore-runners of Wind that will soon follow.

The Lord Bacon says, the following are prognostics of high Winds or tempests arising.

When the sea resounds upon the shore, when the Winds murmur in the woods, without any apparent Wind, they portend that Wind will follow; for such Winds, breathing chiefly out of the earth, are not first perceived, except they are pent by water or wood, and therefore a murmur out of the caves likewise portends as much.

When the brightness of the smaller stars is on a sudden obscured, it is a sign of a tempest arising, for the upper regions of the air perceive the matter of the collection of tempests and Winds, before the air here below; therefore the obscuring of the smaller stars is a sign of tempest following.

He says, the air and fire have subtile perception of the rising Winds before men.

We may perceive the trembling of a candle will dis-

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cover a Wind, that otherwise we do not feel; and the flexuous burning of flames shews the air is beginning to be unquiet; and in like manner coals of fire, by casting off the ashes more than usual; and as for the ashes, it is not to be admired at, if the Wind unperceived shake them off; for it is a common thing to try which way the Wind blows, by throwing up Grass, chaff, or such like things, into the air.

Signs of the Wind's ceasing.

If a hasty shower of rain falls, when the Wind has raged for some hours, it soon abates.

If water ruckles much, and frequent bubbles arise, the storm is but of a short continuance.

If sparrows chirp merrily, and moles come out of their holes, it is a sign of the storm ceasing.

If the bird called king's-fisher, or halcyon, attempts the seas when the Wind blows hard, it is a sign of its abating.

Of WINES, and vinous liquors.

WINE is a brisk, agreeable, and spirituous juice, drawn from vegetable bodies, and fermented.

Dr. Boerhaave characterizes Wine, that the first thing that it affords by distillation, be a thin, fatty, inflammable, &c. fluid, called a spirit; and in this it is distinguished from another class of fermented vegetable juices; viz. vinegars, which, instead of such spirit, yield for the first thing an acid, uninflamable matter.

In order to the making Wines, it will be of great advantage to be well acquainted with the business of fermentation. This Dr. Boerhaave defines and explains as follows:

Fermentation is a change produced in vegetable bodies, by means of an intestine motion excited therein; the effect whereof is this, that the part which first rises from them in distillation, is either a thin, fat, acrid, hot, transparent, volatile, and inflammable fluid, that will mix with water; or else a thin, acid, pellucid, less volatile, uninflamable liquor, capable of extinguishing fire.

The liquor, obtained by means of fermentation, is called thin, because none appears to be thinner than the spirit of fermented vegetables; acid, because it acts almost like fire, when applied to the tongue, or other parts of the body; volatile, because there appears to be no liquor, that is raised with greater ease; but it is this liquor being totally inflammable, and at the same time capable of mixing with water, that ultimately distinguishes fermentation from all other operations in nature; for neither putrefaction, digestion, effervescence, or any thing of that kind, will ever afford a liquor at once possessed of those qualities.

Putrefaction, indeed, as well as fermentation, is performed by means of an intestine motion; but the former will never produce either of the liquors above described, as the effects of fermentation; i. e. neither a vinous nor acetous liquor.

We see then, that there are two different effects of fermentation, the production of an inflammable spirit, and an uninflamable acid; and whatever operation will afford neither of these liquors, is improperly called fermentation, which therefore can only take place in the vegetable kingdom; for all the art in the world, so far as hitherto appears, will never gain such spirits from animals or fossils; and consequently never excite an actual and real fermentation in them; for fermentation is the single operation in nature, by which such spirits can be obtained.

2. Any vegetable liquor so fermented, as to afford the inflammable spirit above-mentioned, for the first thing in distillation, we call Wine; but if the liquor be so fermented, as first to afford the acid uninflamable one, it is called vinegar; by which we mean every thin, acid, volatile, vegetable liquor, capable of extinguishing fire. So likewise, under the name of Wine,

we

we include beer or ale, mead and metheglin, cyder, perry, all sorts of artificial Wines, and whatever liquors afford spirits possessed of the properties before set down.

The like is to be understood of vinegar, which is obtainable from all the same bodies that afford Wine; so that we have either the Wine or vinegar of all sorts of fruits, as of Grapes, Currants, Mulberries, Cherries, &c. all sorts of Grain, as Barley, Wheat, Oats, &c. all sorts of pulse, as Beans, Peas, Tares, &c. all sorts of roots, as Turneps, Carrots, Radishes, &c. and in short, all sorts of vegetable substances, even Grass itself.

3. All the bodies capable of being changed by fermentation, either into Wine or vinegar, are said to be fermentable bodies; and because such a change can only be wrought, so far as we know at present, upon vegetables, these alone are accounted fermentable.

4. Any matter, which being mixed with a fermentable body, increases its intestine motion, or excites or forwards the fermentation, is called the ferment; and, according to the doctrine before delivered, nothing can properly be called so, but what will produce either Wine or vinegar.

These fermentable bodies may be reduced to the following classes;

The first class will consist of the meally feeds, i. e. all the grain, which, being fully ripe, and well dried, may be reduced, by grinding to a light meal or flour, that is neither clammy nor unctuous.

The second class consists of all the pulpy summer fruits, which, when ripe, affect the tongue with the sense of acidity and sharpness, as Apples, Pears, Grapes, Gooseberries, &c. Under this class may be ranged all manner of bulbous pulpy roots growing in the ground, if they are first deprived of their volatile alkaline salt, which is apt to determine them to putrefaction.

The third class takes in all the juicy parts of plants, as the leaves, flowers, stalks, and roots, provided they are not too oily, or too alkaline; in which cases vegetables will rather putrify than ferment.

The fourth class contains the fresh, expressed, and native juices of all kinds of vegetables; to which may be added, all the native saline liquors that distil from wounded plants, as the tears of the Vine, the Walnut, the Birch-tree, &c.

Under the fifth class come the most perfect of all the vegetable juices, viz. those that are unctuous, condensed, and elaborated by nature herself, such as honey, manna, sugar, and all other kinds of concocted juices capable of dissolving in water.

In order to fit any of the fermentable bodies for fermentation, there are several particulars requisite:

1. Maturity; the juice of unripe berries, as of Currants or Gooseberries, for instance, will scarce be brought to ferment at all, while it is very difficult to hinder their juice, when fully ripe, from falling spontaneously into fermentation.

Thus the juice of unripe Grapes, being incapable of fermenting, is a rough acid liquor, called verjuice, that will for several years remain in the same unactive state; but after they are come to maturity, it can no sooner be pressed into the vessel, than it becomes a fermentable spirituous fluid.

2. Another requisite to prepare a body for fermentation is, that it should contain only a moderate proportion of oil; for if it either exceeds in the quantity, or be entirely destitute of oil, it will never be brought to ferment at all. Thus Almonds, Fennel-seeds, &c. are always deprived of their oil before they are attempted to be fermented.

3. The bodies intended for fermentation must not be too acid or austere, as is plain from the acid juices of unripe fruit, which are not greatly disposed to ferment.

4. The last thing required to fit and prepare a body to undergo fermentation, is the property of dissolving in water; for want of which, all acid bodies, and such woods, roots, and herbs, as are dry and hard, become unfit for this operation; for unless the parts of

these bodies are dissolved, the requisite intestine motion thereof will not ensue; but without such motion fermentation cannot subsist.

Hence honey itself can never be made to ferment, whilst it retains its native thick consistence; but being dissolved by heat, or let down with water, it immediately enters the state of fermentation. On the other hand, so violently as the juice of Grapes affects this state, yet if, immediately after it is expressed, it be reduced, by boiling, to the consistence of a jelly, it will lie quiet, and never ferment at all, unless it be again diluted, and let down with water.

Ferments are of two kinds; the natural or spontaneous, and those produced by fermentation.

The spontaneous, or natural ferments, are,

1. All the fresh expressed juices of fully ripened plants, which easily run into fermentation.

2. Honey, manna, sugar, and the like thick and inspissated vegetable juices, which cause a strong fermentation.

3. The ferments produced by fermentation are, the fresh flowers or yeast of any fermenting vegetable juice or liquor, as of Wine, beer, &c. By flowers or yeast is to be understood that light frothy matter, which covers the surface of the fermenting liquor in the nature of a tender crust; and which, being added to any other fermentable juices, will excite a fermentation in them.

4. The fresh fæces or lees of any fermenting liquor, as of Wine, ale, beer, &c. For all fermentation divides the liquor, which is the subject of it, into three parts, viz. the flowers or yeast, which possess the uppermost place; the operating or fermenting fluid, which lies in the middle; and the gross and seemingly exhausted matter, which, falling to the bottom of the vessel, is known by the name of lees, sediments, feculence, or mother, that will, if raised again out of the liquor into which it was precipitated, cause it to work afresh.

Thus, when a hoghead of Wine has done fermenting; and is fined down, if the vessel be any way shaken or disturbed, it will grow turbid again, and ferment anew, as vintners very well know. For such as were the flowers in the act of fermentation, such is the mother after the action is over.

5. Acid paste, or bakers leaven, which is no more than any kind of meal brought into a close lump by means of water, after the same manner as common bread is made; for this being set in a warm place, during the space of four or five days, it will first swell, then turn very acid, and at length become a ferment.

6. Those ferments which reside in, or stick to the sides of the casks that have contained fermenting liquors; for such casks will of themselves raise a fermentation in the liquors committed to them; and Helmont was of opinion, that they might be capable of doing this for ever.

Upon account of this inherent ferment it is, that old-seasoned vessels, or such as have been long employed by vintners or brewers, bear so great a price among them.

It is very remarkable, though a thing well known to brewers and vintners, that a new cask checks the fermentation of vinous liquors, and renders them weak and spiritless; for which reason they never chuse to make use of such a cask before it is seasoned, as they call it, by having first contained some spirituous or fermented liquor or other; which being plentifully drank in by the wood, the original liquor comes to be deprived of a large proportion of its spirit, and more fermentable part, whence the remainder must needs taste flat and vapid.

This is certain, that even must itself will not easily ferment in a new pure vessel, but with the greatest facility, if put into one that has before contained fermenting juices; for the parts of the fermenting liquors, with which such a vessel must have been impregnated, presently rouse and determine it to action.

7. There are some ferments that appear to be heterogeneous, or which are improperly called ferments;

as the white of an egg beat into a froth, which is used when the liquor to be fermented proves too dilute or thin to sustain the operation. For in this case the fermentable parts of the fluid easily extricate themselves, and so fly off for want of something to detain and keep them in the body of the liquor; which therefore requires some viscid substance to be mixed with it, in order to prevent this avolation of its subtile parts. And this cannot be more commodiously effected than by the white of an egg.

8. Of the like heterogeneous kind of ferments are all fixed and acid salts. Thus, if the liquor designed for fermentation be too acid to work kindly, the addition of an alkaline salt, as that of Vine branches, or any saponaceous substance, will, by taking off from the acidity, fit it for, and so promote the operation; but if the liquor be of itself too alkaline, then tartar, or the like, ought to be added to it, to promote the fermentation.

But this does not happen, because either the acid or alkaline salt is an actual ferment, as some chymists have vehemently contended for the alkaline, because the salts employed respectively temper and take down the predominant acid or alkali, which before hindered the fermentation of the liquor,

And if such salts should in due quantities be mixed with any proper subject of fermentation, possessed of all the qualities before set down, as requisite to it, the operation would be entirely checked and prevented; so that alkaline bodies may as well be said to hinder, as promote fermentation.

9. And lastly; Of the same sort are certain austere or rough tasted substances, as all harsh and green fruit, Pomegranate bark and flowers, the Tamarisk bark, Crab Apples, unripe Medlars, &c. which, when the liquor designed for the fermentation is too much broken in its parts, or dissolved in its texture, bind it together again by its astringent quality; so that though it was before too thin and aqueous, it is now reduced to a proper consistence for fermentation.

Thus, when must proves thin and watery, it will not ferment kindly, unless some austere or astringent ingredient, as red Rose leaves, or the like, be added to it, to thicken and improve its consistence, and at the same time prevent the air it contains from making too easy an escape.

But when a liquor is too austere, or its roughness proves so great, that it cannot ferment, the addition of a fixed alkali, in a proper quantity, will remove the obstruction, and leave it at liberty to work.

So likewise, when the operation is prevented by too large a proportion of acid in the liquor, the method is to throw chalk, crab's eyes, bole armoniac, or the like, into it; but if it be too unctuous or oily, as is the case of some Spanish Wines, salt of tartar is made choice of; and thus, as circumstances alter, different bodies are employed to stop or promote fermentation in liquors.

In order for fitting the subjects of the second class for fermentation, and making vinous liquors, viz. pulpy summer fruits, and the roots of bulbous plants; in case they prove crude or hard, they are to be first boiled in water, and afterwards bruised, which will dispose them for fermentation; but if such subjects are juicy, they may be directly ground to a pulp, or have the juice pressed from them; or if they are very succulent, there may be no occasion to bruise them, only directly to commit them to the press, and squeeze out all their juice.

But if the flesh or substance be strong and tough, it may be proper to rasp, shave, or cut them into small pieces, which will be of service in some bulbous roots, and make them yield their juice with the greater ease, and in greater plenty.

Prepared fruits seldom stand in need of any thing to make them ferment, for they generally begin to work of their own accord; but if the weather should prove exceeding cold, or the operation proceed but languidly, it may not be amiss to quicken it by adding a

small proportion of a ferment, as a little yeast, the lees or mother of Wine; or even a little new Wine may serve the turn:

The subjects of the third class, viz. the succulent parts of plants, need only, in order to their fermentation, be beat to a thick kind of pulp; while they are fresh, and mixed with a proper proportion of rain water, that is just enough to dilute them; for if much water be employed, the spirit will be the weaker for it.

These require but very little ferment, or none at all, to make them work in the summer season; and no large proportion in the winter; but in case any at all be required, nothing will prove more serviceable than honey or sugar.

The subjects of the fourth and fifth classes, viz. the fresh native juices, and weeping liquors of vegetables, with the condensed and unctuous juices of the same, are to be diluted, and let down with rain water, to a due consistence, which is then thought to be obtained, when the compound liquor will just keep a new-laid egg afloat; but some vegetable juices may naturally be of this very density or consistence, and in that case they will require no water at all. If any be thicker or denser, they ferment not so kindly; and if thinner or rarer, they afford but a weak spirit. Thus, in order to ferment sugar, treacle, or any common syrup, we first let down the matter with water, to the consistence above-mentioned; and then, if there be occasion, put yeast to it, to quicken the fermentation, and make it proceed kindly.

The subjects of the fourth class, viz. the prepared recent juices, and spontaneous tears of vegetables, are so far from requiring any ferment, that it often proves very difficult to strain or check the fermentation they naturally fall into, especially if the season be warm, and the juices rich; at most, if the weather should prove cold, they need only be set in a warm place to make them work.

The subjects of the fifth class, viz. the prepared or inspissated juices of vegetables, require no ferment at all in the summer, and but a small proportion in winter, to set them on working; less than an ounce of yeast to twenty pints of prepared liquor, will usually do for that purpose in the coldest season; but in hot countries, or sultry seasons, these prepared juices, and especially sugar, are of themselves apt to fall into a too violent fermentation, which therefore ought to be abated by the contrary means.

All the vegetable bodies of the several classes designed for fermentation, and prepared for it in the foregoing manner, ought, together with their ferments, to be committed to casks of Oak already seasoned with the same kind of fermented liquor, or some other, consisting of subtile and penetrating parts. Then those casks or vessels having their bung-holes lightly covered with a thin or single cloth, and being set in a warm place, the liquor will ferment.

The mouths of the vessels are thus slightly covered over, that the air may have a free passage in and out of them, for they are here designed to serve as vent-holes; and these vessels are ordered of wood, because fermentation is never observed to be so well carried on in those of glazed earth or glass; though on account of their transparency, it is sometimes performed in the latter, that the phaenomena may be better observed.

The preparatory business of fermentation hitherto described, has been carried on by art, but nature must now perform the rest of the work; so that we are here only concerned to observe the phaenomena which arise in the operation.

When therefore any fermentable body is prepared after the manner above delivered, and with its due proportion of a ferment, committed to a large strong glass vessel, standing in a warm place;

1. The whole body of the liquor soon begins to swell, heave, rarefy, and send up little bubbles to the top of the vessel, where they burst with an audible noise, and form into froth. Now the liquor which was before

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fore transparent, grows opaque, and a violent uninterrupted intestine motion manifests itself therein.

2. The parts of the fermenting fluid appear to be incredibly elastic, and the motion of them exceeding violent. Indeed, by means of this property of fermentation, very terrifying and surprising actions may be performed. Thus, if a hundred pints of must were, on some warm day in autumn, to be confined close in a vessel of Oak above an inch thick in the sides, and made ever so tight and strong with iron hoops, yet could not this prevent the working of the liquor; but in spite of so great a resistance, it would burst the vessel, with a report as loud as that of a cannon.

And therefore the way to preserve new Wine in the state of must is, to put it up in very strong but small casks, firmly closed on all sides; by which means it will be kept from fermenting, and then it goes by the name of *stun*: but if it should happen to fall into fermentation, the readiest and only way to stop it, is by the fume of sulphur, or something of the like nature.

Were it not for the knowledge of this property of burning sulphur, the wine merchants and vintners might frequently sustain great damages from the bursting of their vessels, when the liquor is upon the fret, or, by some alteration in the air, or other accident, begins to ferment again: but the smoke of a little common brimstone, or a lighted match dipped in it, and held under a cask of Wine that is just ready to burst its hoops, will calm its fury, and make it subside as suddenly as a spoonful of oil, thrown into a large foaming copper of boiling sugar, takes down its heat, and prevents the mischief it might otherwise occasion.

3. A thick skin, or crusty scurf, forms itself on the surface, through which the elastic or fermenting matter is continually breaking. This crust appears to be the principal cause of fermentation; for it keeps in, or prevents the spirituous part of the liquor from flying off; and if it be frequently broken, it puts a check to the fermentation, and will often entirely stop it, if wholly taken away.

4. This skin or crust, which we now call *flowers* or *yeast*, gradually consumes and precipitates to the bottom of the liquor; in which case it is called by the name of *feces* or *mother*; and after this, the fluid above it immediately becomes transparent again, ceases to hiss and bubble, has a very penetrating, pungent, spirituous, or vinous taste and scent, with a mixture of acidity and sweetness. And now the liquor, having undergone the operation of fermentation, is become Wine.

The vapour arising from the liquor, during its fermentation, ought not to be approached too near, or breathed in too great a quantity, because it is highly poisonous; and, if it prove not mortal, may at least render the person apoplectic and paralytic. We have accounts in the French and German Transactions, of people who were immediately struck dead, by receiving at the nose the fumes that issued from large vessels of Wine, in the state of fermentation.

And now, if the liquor thus fermented be stopped down close, it will begin to feed upon and digest its own lees or mother, and at length consume them; in which case we commonly say, the Wine begins to ripen; and afterwards, this mother shoots to the sides of the containing vessel, and there appears in the form of an essential salt, which is then called *tartar*.

The space of time required for finishing the fermentation differs with the subject matter, the season of the year, the nature of the place, and other circumstances; but it is known to be perfectly performed by the several phenomena just now mentioned.

As soon as the flowers fall to the bottom, the vessel should be bunged down, otherwise the volatile part would fly off, and the fermented liquor become vapid and flat.

In this state it ought to stand for some weeks in a cool place, by which means it will grow stronger, and more liquid; for during this time, it imbibes and consumes its own feces, which abound in subtle spiritu-

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ous parts, and grows soft, and loses of its acidity, by throwing off its tartar.

And the longer it is thus suffered to stand, the more strength it gains, or the more spirit it will yield in distillation.

Thus, for instance; malt liquors, newly brewed, afford but a small quantity of inflammable spirit; but if suffered to remain for some weeks in the vessel, till they become fine and clean, they will yield a much greater proportion: though to avoid so great an apparatus of vessels as would then be required, malt liquors, brewed, in order to make spirits, are seldom kept, but immediately after fermentation committed to the still. And hence we are furnished with a reason, why all stale vinous liquors are stronger, and inebriate sooner, than such as are new.

The physical effects.

The physical properties of a vinous liquor, prepared in the manner above described, are those which follow:

1. It will have an inebriating quality, when received into the body; and nothing is properly possessed of this quality, but what has been first fermented.

For if a person should eat ever such a quantity of Grapes, or drink ever so freely of must, he might indeed bring a looseness upon himself by that means, but he would not be fuddled. So likewise to take down large draughts of sweet-wort, or the tincture of malt, might throw one into a violent vomiting and flux, but never produce the symptoms of drunkenness. And whatever some pretend, as to Mandrake, Hemlock, Poppies, opium, and the like, the effects they have upon the human body are rather stupefying than inebriating; but drunkenness is different from stupefaction.

An over dose of vinous liquors makes a man brisk, lively, and joyful, or disposes him to sing, dance, or be merry; at length however, his legs will not support him; and, if the fit be violent, he grows furious, raving, or paralytic, and so he dies.

But opium has not these effects; it brings on a profound sleep; and he who has taken too much of it, dies lethargic.

2. Wine has the faculty of heating the body. Nothing appears to cool the body more than Currants; yet the wine prepared from them is very heating. The like is to be understood of Cherries, and all fermentable bodies, though ever so cold, for these will afford a vinous liquor.

3. It is inflammable, and will mix with water.

4. It contains tartar, and affords it after the fermentation is over. This tartar is the essential salt of the vegetable made use of, and differs from the lees or mother, being resolvable by distillation into a water, a spirit, two kinds of oil, an alkaline salt, and earth. All fermented vegetables afford it. Must yields a feculent salt, and no tartar; but if once it works, so as to become pure Wine, it will, in the space of half a year, throw off a clean tartar, which therefore appears to be the effect of a perfect fermentation, and accordingly is never obtained without it.

5. It retains neither the colour, taste, nor smell of the specific vegetable from which it is made. Thus we have seen, that Rosemary affords a quite different water, after it has been fermented, from what it did before. Thus fermented Hydromel, malt liquors, treacles, sugar, &c. yield spirits by distillation, that cannot be distinguished from one another.

The Grapes of some countries are as sweet as honey, and so is their must before fermentation, yet the Wine prepared from either, may have little or no sweetness, and sometimes even gain a degree of acidity. It is not easy to believe that Rhenish Wine should proceed from so sweet a Grape as it does.

6. It acquires a somewhat acid and spirituous taste and smell. The taste of honey or malt, &c. is sweet, and their scent scarce perceivable, before you commit them to fermentation; but, after having undergone that

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that operation, they are less sweet, but sharper upon the tongue, and affect the nose with a brisk, spirituous, or vinous odour.

7. It contains the volatile salt and oil of the vegetable, attenuated, and reduced into one spirit, as may appear by the chemical analysis of a fermented subject.

8. It renders the oil of the vegetable more volatile than the water. When an unfermentable vegetable is distilled, the first thing that comes over is water, and the next the essential oil, but the contrary is observed after fermentation; for, by that operation, the oil is rendered more volatile than the water, and therefore rises first in distillation, having been broken and ground so fine by the preceding operation, as now to come over the helm, not in its own form, as before, but as the finest and most volatile part of the fermented liquor, capable of uniting with water.

The things that promote fermentation are,

1. Rest; by means of which the crust on the surface may remain unbroken, for it is this crust that prevents the spirituous part from flying off.

2. A free admission of the external air, so that it may come at the internal parts of the fermenting fluid; for, according to Mr. Boyle, if a fermenting liquor be put into his exhausted receiver, the operation immediately ceases.

3. A moderate degree of warmth; for too great heat, and too great cold, are the bane of fermentation.

4. A proper season of the year; that is, when the vegetables of the same species with that made use of are in their bloom, for it is then their juices are most in motion; accordingly we find, when Vines are in the blossom, the Wines of former years growth will again spontaneously run into fermentation. When these several conditions meet, fermentation is performed to the best advantage.

The things which check or hinder fermentation are,

1. Too large a proportion of acid salts, such as spirit or oil of vitriol, oil of sulphur per Campanam, spirit of salt, &c. Thus, when any liquor ferments too violently, a few drops of oil put into it, or the burning a little sulphur under or near the vessel will immediately check and restrain its fury.

2. An over-proportion of fixed alkalies; such are salt of tartar, pot-ashes, or saponaceous bodies.

3. Terrestrial alkalies, as chalk, marl, crabs eyes, &c.

4. A close stopping up of the vessel.

5. A great degree of cold.

6. A violent compression of the air in a vessel, which Mr. Boyle has shewn, will stop fermentation, as well as taking out the air by means of his pneumatic engine.

Some short general directions as to the making of Wines.

Wine is made of Grapes, by stamping them in a vat, or crushing and expressing the juice out of them in a press, and then fermenting, &c.

In the southern part of France their method is, for red Wines, to tread the Grapes, or squeeze them between their hands, and to let the whole stand, juice and husks, till the tincture be in colour as they would have it, and then they press it; but for white Wines, they press the Grapes immediately.

When they have been pressed, they tun the must, and stop up the vessel, leaving the cask empty about the depth of half a foot, or better, to give room for its working.

At the end of ten days they fill this space with some other proper Wine, that will not provoke it to work again, repeating this every ten days for some time: new Wine spending itself a little before it be perfect. About Paris, and in the northern parts of France, they let the marc and must stand two days and nights for white Wines, and at least a week for claret Wines, before they tun it, and while it continues working, they keep it as warm as possible.

Some, upon stopping it up for good and all, roll the cask about the cellar to mix it with the lees, and after

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it has been settled a few days, rack it off with great improvement.

To fine it down, they put shavings of green Beech into the cask, but they first take off all the rind, and boil them an hour in water to extract their rankness, and afterward dry them in the sun, or an oven. A peck of these will serve for a hoghead of Wine; they put it in a gentle working, and purify it in twenty-four hours; they also give it an agreeable flavour.

Some sweeten their Wines with Raisins of the sun, trod in the vat with the Grapes, they having been first plumped by boiling; others by boiling half the must, scumming it, and tuning it up hot with the other.

Wine is distinguished, from the several degrees and steps of its preparation, into,

1. Mere-goute, (mother-drop,) which is the virgin Wine, or that which runs of itself out of the tap of the vat, before the Grapes are trodden.

2. The must, furmoust, or scum, which is the Wine or liquor in the vat, after the Grapes have been trodden in the vat.

3. The pressed Wine, or vin de pressurage, which is that squeezed with a press out of the Grapes, half-bruised by treading.

4. Boisson, or draught Wine. This is made of the husks left of the Grapes, which are called rape or marc, by throwing water upon which and pressing afresh, they make a liquor for servants.

Wines are also distinguished into

Vin doux, or sweet Wine, which is that which has not yet worked nor boiled.

Bourou; that which has been prevented working by casting in cold water.

Wine of the cuve, or worked Wine, i. e. that which has been let to work in the vat to give it a colour.

Vin cuit, i. e. boiled Wine; that which has had a boiling before it worked, and which, by that means, still retains its native sweetness.

Vin passé, i. e. strained Wine; that which is made by steeping dry Grapes in water, and letting it ferment of itself.

The goodness of Wine consists in its being neat, dry, clear, fine, brisk, without any taste of the foil, of a clean steady colour; in its having a strength, without being heady, a body without being sour, and its keeping without growing hard.

After Wines have been made, they require to be managed according to their different state and circumstances. We shall therefore consider them under these four general heads following:

1. The natural purification or clarification of Wines, whereby, of themselves, they pass from the state of crudity and turbulency, to that of maturity, by degrees growing clear, fine, and potable.

2. The unseasonable workings, frettings, and other sicknesses, to which, from either internal or external accidents, they are afterward subject.

3. Their state of declination or decay, wherein they degenerate from their goodness and pleasantness, becoming palled, or turning into vinegar.

4. The several artifices used to them, in each of these states and conditions. As to the first, viz. the natural clarification of new Wines, two things occur, which deserve consideration; the manner how, and the cause by which the same is effected.

As for the manner, it is to be observed, that Wine, while yet in the must, is usually put into open vessels, the abundance and force of the spirits, i. e. the more subtle and active parts therein contained, being then so great as not to endure being imprisoned in close ones; at which time it appears troubled, thick, and feculent, all parts of it being violently moved and agitated, so that the whole mass of the liquor seems to boil like water in a cauldron over the fire.

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This tumult being in some degree composed, and the gas sylvestre (as Van Helmont calls it,) or wilder spirit sufficiently evaporated, they then pour the must into close vessels, there to be farther defecated by continuance of the same motion of fermentation, reserving the frost or flower of it, and putting the same into small casks hooped with iron, lest otherwise the force of it might break them.

This flower thus separated, is what they call *stum*, either by transposition of the letters in the word must, or from the word *stum*, which in High Dutch signifies mute, because this liquor (as one may say,) is hindered from that maturity, by which it should speak its goodness and wholesomeness.

This being done, they leave the rest of the Wine to finish its own fermentation, during which it is probable that the spirituous parts impel and diffuse the grosser and feculent parts up and down in a confused and tumultuous manner, until, all being disposed in their proper regions, the liquor becomes more pure in substance, more transparent to the eye, more piquant and gustful to the palate, more agreeable to the stomach, and more nutritive to the body.

The impurities being thus separated from the liquor, are upon chemical examinations, found to consist of salts, sulphur (each of which is impregnated with some spirits,) and much earth, which being now dissociated from the purest spirits, either mutually cohere, coagulate, and affix themselves to the sides of the vessels in form of a stony crust, which is called tartar and argol, or sink to the bottom in a muddy substance, like the grounds of ale or beer, which is called the lees of Wine. And this is the process of nature, in the clarification of all Wines, by an orderly fermentation.

As for the principal agent, or efficient cause of this operation, it seems to be no other but the spirit of the Wine itself, which moving every way in the mass of the liquor, thereby dissolves that common tie of mixture, whereby all the heterogeneous parts thereof were combined and blended together; and having gotten itself free, at length abandons them to the tendency of their gravity, and other properties, which, they soon obeying, each kind consorts with its like, and betaking themselves to their several places or regions, leave the liquor to the possession and government of its noblest principle, the spirit. For this spirit, as it is the life of the Wine, doubtless it is also the cause of its purity and vigour, in which the perfection of that life seems to consist.

From the natural fermentation of the Wines, we pass to the accidental; from their state of soundness, to that of their sickness, which is the second general head.

We have the testimony of experience, that frequently even those Wines that are good and generous, are invaded by unnatural and sickly commotions, or (as the Wine coopers call them) workings; during which they are turbulent in motion, thick of consistence, unsavoury in taste, unwholesome in use, and, after which, they undergo sundry alterations for the worse.

The causes of this may be either internal or external.

Among the internal, the chief place may be assigned to the excessive quantity of tartar, or of lees, which contain much salt and sulphur, and continually send forth into the liquor abundance of quick and active particles, that like *stum*, or other adventitious ferment, put it into a fresh tumult or confusion, which, if not in time allayed, the Wine either grows rank or pricking, or else turns sour, by reason that the sulphur being too much exalted above the rest of the elements or ingredients, predominates over the pure spirits, and affects the whole mass of liquor with sharpness or acidity; or else it comes to pass, that the spirits being spent and flown away in the commotion, the salt, dissolved and set afloat, obtains the mastery over the other similar parts, and introduceth rankness or ropiness.

Nay, if those commotions chance to be suppressed be-

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fore, the Wine is thereby much depraved, yet do they always leave such ill impressions, as more or less alienate Wine from the goodness of its former state; in colour, consistence, and taste.

For hereby all Wines acquire a deeper tincture, i. e. a thicker body or consistence; sacks and white Wines changing from a clear white to a cloudy yellow; and claret losing its bright red for a dusky Orange colour, and sometimes for a tawney. In like manner they degenerate also in taste, and affect the palate with foulness, roughness, and rancidity, very unpleasant.

Among the external are commonly reckoned the too frequent or violent motion of Wines, after their settlement in their vessels; immoderate heat, thunder, or the report of cannon, and the admixture of any exotic body, which will not symbolize or agree, and incorporate with them; especially the flesh of vipers, which has been frequently observed to induce a very great acidity upon even the sweetest and fullest-bodied Malaga and Canary Wines.

This brings us, in the next place, to the third previous thing considerable; viz. the palling or flatting of Wines, and their declining towards vinegar, before they have attained to their state of maturity and perfection.

Of this the greatest and nearest cause seems to be their jejuneness and poverty of spirits, either native or adventitious:

Native, when the Grapes themselves are of a poor and hungry kind, or gathered unripe, or nipt by early frosts, or half starved in their growth, by a dry and unkindly season, or too full of watery parts:

Adventitious, when the liquor, rich perhaps, and generous enough at first, comes afterwards to be impoverished by loss of spirits, either by oppression, or by exhaustion.

The spirits of Wine may be oppressed, when the quantity of impurities or dregs, with which they are combined, is so great, and their crudity, viscosity, and tenacity, so stubborn, that they can neither overcome them, nor deliver them from the adhesion; but are forced to yield to the obstinacy of the matter on which they should operate, and so to remain unactive and clogged, as may be exemplified in the coarse Wines of Moravia, which, by reason of their great austerity and roughness, seldom attain to a due exaltation of their spirits, but still remain turbulent, thick, and in a state of crudity, and therefore easy pall; in which respect they are condemned by some German physicians, as bad for generating the scurvy, and administering matter for the stone and gout, they yielding more of the tartar than other Wines.

The spirits of Wine may be exhausted or consumed, either suddenly or gradually; suddenly, by lightning, which spoils Wine, not by congelation or fixation of its spirits; for then such Wines might be capable of being restored by such means as are apt to reinforce and volatilize the spirits again, contrary to what hath been found by experience; but perhaps by disgregation, and putting them to flight, so as to leave the liquor dead, palled, and never to be revived by any supply.

Gradually, two ways; viz. by unnatural fermentation; of the ill effects of which, something has been already said; or by heat from without; of which we have an instance in the making of vinegar, which commonly is done by setting the vessels of Wine against the hot sun, which, beating upon the mass of liquor, and rarefying the finer parts thereof, gives wings to the fugitive spirits to fly away together with the purer and more volatile sulphur, leaving the remainder to the dominion of the salt, which soon debaseth and infecteth it with sourness.

This being the common manner of turning Wine into vinegar, in all ages, and in all countries, it may be doubted, whether spirit of Wine may be drawn out of vinegar, notwithstanding it hath been delivered as practicable by Sennertus himself.

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The times of the year when Wines are observed to be most prone to ferment and fret, and then to grow qually (as it is called,) that is, turbulent and foul, are Midsummer and Allhallowtide, when our vintners are wont to rack them from their gross lees, especially Rhenish, which commonly grows sick in June, if not racked; and they chuse to do it in the wane of the moon, and fair weather, the wind being northerly.

Having thus succinctly recounted the most remarkable distempers of Wines, guessed at their respective causes, and touched upon the times, it is proper to proceed to their usual remedies; such, at least, as may be collected from Wine coopers and vintners; which is the fourth and last part proposed to be treated of.

To begin therefore with some of the artifices used to Wines when yet in must; it is observable, that tho', to raising a fermentation in them at that time, there is not so much need of any additional ferment, as there is in the wort of ale, beer, hydromel, metheglin, and other sorts of drinks, familiar to us in England; because the juice of the Grape is replenished with generous spirits, sufficient of themselves to begin that work; yet it is usual in some countries to put quick lime either upon the Grapes, when they are pressing, or into the must; to the end that, by the force and quickness of its saline and fiery particles, the liquor may be both accelerated and assisted in the working.

For the same reason perhaps, it is, that the Spaniards mix with their Wines, while they are yet flowing from the press, a certain thing they call giesfo, which probably is a kind of gypsum or plaister, whereby the Wines are made more durable, of a paler colour, and pleasanter taste; others put into the cask shavings of Fir, Oak, or Beech, for the same purpose.

Again; though the first fermentation succeeds generally well, so that the whole mass of liquor is thereby delivered from the gross lee; yet sometimes it happens either through scarcity of spirits at first, or through immoderate cold, that some part of those impurities remain confused and floating therein.

Now, in this case, Wine coopers put into the Wine certain things to hasten and help its clarification; such as being of gross and viscous parts, may adhere to the floating lee, and sinking, carry it with them to the bottom; of which sort are isinglass, and the whites of eggs, or such as, meeting with the grosser and earthy particles of the lee, dissociate and sink them by their gravity; of which kind are the powders of alabaster, calcined flints, white marble, roche allum, &c.

The Grecians, at this day, have a peculiar way of spurring nature, in fining and ripening the strongest and most generous Wines; and this is done by adding to them, when they begin to work, a proportionate quantity of sulphur and allum; not (as is very probable) to prevent their fuming up to the head, and inebriating, according to the conjecture of that great man, the Lord St. Albans; for, notwithstanding this mixture, they cause drunkenness as soon, if not sooner than other Wines; nor are men intoxicated with the vapours of Wine flying up immediately from the stomach into the brain; but only to excite and promote fermentation, and hasten their clarification that ensues thereupon; the sulphur perhaps helping to attenuate and divide those gross and viscid parts, wherewith Greek Wine abounds, and the allum conducing to the speedier precipitation of them afterwards. And a learned traveller relates, that some merchants put into every pipe of their Greek Wine a jill, or thereabouts, of the chemical oil of sulphur, in order to preserve it the longer clear and sound:

Which, though it is very probable, because the sulphur is known to resist putrefaction in liquors, yet one would decline the use of Wines so preserved, unless in time of pestilential infection.

But of all ways of the hastening the clarification and ripening of Wine, none seems to be more easy, or

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less noxious, than that borrowed from one of the ancients by the Lord Chancellor Bacon; which is, by putting the Wine into vessels well stopped, and letting it down into the sea.

That this practice was very ancient, is manifest from that discourse of Plutarch, Quæst. Natur. 27. about the efficacy of cold upon must, whereof he gives this reason, That cold, not suffering the must to ferment, by suppressing the activity of the spirits therein contained, conserveth the sweetness thereof a long time; which is not improbable; because experience teaches, that such as make their vintage in a rainy season, cannot get their must to ferment well in a vault, unless they cause great fires to be made near the casks; the rain mixed with the must, together with the ambient cold, hindering the motion of fermentation, which arises chiefly from heat.

That the same is frequent at this day also, may be collected from what Mr. Boyle has observed in his History of Cold, on the relation of a Frenchman; viz. that the way to keep Wine long in the must (in which the sweetness makes many to desire it) is, to tun it up immediately from the press; and before it begins to work, to let down the vessels, closely and firmly stopped, into a well, or deep river, there to remain for six or eight weeks; during which time the liquor will be so confirmed in its state of crudity, as to retain the same, together with its sweetness, for many months after, without any sensible fermentation.

But it may be objected, How can these two so different effects, the clarification of new Wine, and the conservation of Wine in the must, be derived from one and the same cause, the cold of the Water?

But this may be conceived without much difficulty; for it seems not unreasonable, that the same cold which hinders must from fermenting, should yet accelerate and promote the clarification of Wine after fermentation; in the first, by giving a check to the spirit before it begins to move and act upon the crude mass of liquor, so that it cannot in a long time after recover strength enough to work; in the latter, by keeping in the pure and genuine spirit, otherwise apt to exhale; and rendering the flying lee more prone to subside, and so making the Wine much sooner clear, fine, and potable. Thus much concerning the helps of new Wine.

The general and principal remedy for the preternatural or sickly commotions incident to Wines after their first clarification, and tending to their impoverishment or decay, is racking, i. e. drawing them from their lees into fresh vessels.

Which yet being sometimes insufficient to preserve them, vintners find it necessary to pour into them a large quantity of new milk, as well to blunt the sharpness of the sulphureous parts now set afloat and exalted, as to precipitate them, and other impurities, to the bottom by adhesion.

But, taught by experience, that by this means the genuine spirits of the Wine also are much flatted and impaired, (for the lee, though it makes the liquor turbid, doth yet keep the Wine in heart, and conduce to its duration;) therefore, lest such Wines should pall and die upon their hands, as of necessity they must, they draw them for sale as fast as they can vend them.

For the same disease they have divers other remedies, particularly accommodated to the nature of the Wine that needs them: to instance a few;

For Spanish Wines disturbed by a flying lee, they have this receipt: Make a parell (as they call it) of the whites of eggs, bay salt, milk, and conduit water; beat them well together in a convenient vessel, then pour them into a pipe of Wine (having first drawn out a gallon or two to make room,) and blow off the froth very clean; hereby the tumult will in two or three days be composed, the liquor refined, and drink pleasantly, but will not continue to do so long; and therefore they advise to rack it from the milky bottom, after a week's settlement, lest otherwise it should drink foul, and change colour.

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If sacks or Canary Wines chance to boil over, draw off four or five gallons; then putting into the Wine two gallons of milk, from which the cream hath been skimmed, beat them till they are thoroughly mixed together, and add a pennyworth of roche allum, dried in a fire-shovel, and powdered, and as much of white starch; after this take the white of eight or ten eggs, a handful of bay salt, and having beaten them together in a tray, put them also into the Wine, filling up the pipe again, and letting the Wine stand two or three days; in which time the Wine will recover to be fine and bright to the eye, and quick to the taste; but you must be fore to draw it off that bottom very soon, and spend it as fast as you can.

For claret, in like manner distempered with a flying lee, they make use of this artifice:

They take two pounds of the powder of pebble stones, baked in an oven, the whites of ten or twelve eggs, a handful of bay salt; and having beaten them well together in two gallons of the Wine, they mix them with that in the cask, and after two or three days draw off the Wine from the bottom.

The same parell serves also for white Wines upon the fret, by the turbulency and rising of their lee.

To cure Rhenish of its fretting (to which it is most prone a little after Midsummer, as was before observed,) they seldom use any other art but giving it vent, and covering the Oaken bung with a tile or slate, from which they carefully wipe off the filth purged from the Wine by exhalations; and after the commotion is by this means composed, and much of the fretting matter cast forth, they let it remain quiet for a fortnight, or thereabouts, and then rack in into a fresh cask, newly fumed with a sulphurated match. As for the various accidents that frequently ensue, and vitiate Wine (after those before-mentioned re-boilings, notwithstanding their suppression before they were incurable;) you may remember they have all been referred to such as alter and deprave Wines, either in colour or consistence, or taste, or smell. Now for each of these maladies our vintners are provided of a cure.

To restore Spanish and Austrian Wines grown yellow or brownish, they add to them sometimes milk alone, and sometimes milk and isinglass well dissolved therein; sometimes milk and white starch; by which they force the exalted sulphur to separate from the liquor, and sink to the bottom; so reducing the Wine to its former clearness and whiteness.

The same effect they produce with a composition of Iris roots and salt-petre, of each four or five ounces, the whites of eight or ten eggs, and a competent quantity of common salt, mixed and beaten in the Wine.

To amend claret decayed in colour, first they rack it upon a fresh lee, either of Alicante or red Bourdeaux Wine; then they take three pounds of Turnsole, and steep it all night in two or three gallons of the same Wine; and having strained the infusion thro' a bag, they pour the tincture into a hoghead (sometimes they suffer it first to fine itself in a rundlet,) and then cover the bung-hole with a tile, and so let it stand for two or three days, in which time the Wine usually becomes well-coloured and bright.

Some use only the tincture of Turnsole.

Others take half a bushel of full ripe Elder-berries, pick them from their stalks, bruise them, and put the strained juice into a hoghead of discoloured claret, and so make it drink brisk, and appear bright.

Others, if the claret be otherwise found, and the lee good, overdraw three or four gallons; then replenish the vessel with as much good red Wine, and roll it upon its bed, leaving it reversed all night; and then next morning they turn it again, so as the bung-hole may be uppermost; which stopped, they leave the Wine to fine.

But in all these cases they observe to set such newly recovered Wines abroach the very next day after they are fined, and to draw them for sale speedily.

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To correct Wines faulty in consistence, i. e. such as are lumpish, foul, or ropy;

They generally make use of the powders of burnt allum, lime chalk plaister, Spanish white, calcined marble, bay salt, and other the like bodies, which cause a precipitation of the gross and viscid parts of the Wine then afloat: as for example;

For attenuation of Spanish Wines that are foul and lumpish, having first racked them into a newly scented cask, they make a parell of burnt allum, bay salt, and conduit water; then they add to these a quart of Bean flour, or powder of Rice; and if the Wine be brown and dusky, milk, otherwise not; and beating all these well together with the Wine, blow off the froth, and cover the bung with a clean tile or stone. Lastly, they rack the Wine again after a few days, and put it into a cask well scented.

The manner of scenting casks is as follows:

They take four ounces of brimstone, one ounce of burnt allum, and two ounces of aqua vitæ; these may be put together in an earthen pan or pipkin, and hold them over a chafing-dish of glowing coals, till the brimstone is melted and runs; then they dip therein a little piece of new canvas, and instantly sprinkle thereon the powders of Nutmegs, Cloves, Coriander, and Anise-seeds. This canvas they fire, and let it burn out in the bung-hole, so as the fume may be received into the vessel; and this is said to be the best scent for all Wines.

To prevent the foulness and ropiness of Wines, the old Romans used to mix sea water with their must.

To cure the ropiness of claret, the vintners, as well French as English, have many remedies; of which these that follow are the most usual:

First they give the Wine the parell, then draw it from the lee, after the clarification by that parell; this done, they infuse two pounds of Tournsole in good sack all night; and the next day, putting the strained infusion into a hoghead of Wine with a spring funnel, leave it to fine, and after draw it for excellent Wine.

Another is this: they make a lee of the ashes of Vine branches, or of Oaken leaves, and pour it into the Wine hot, and after stirring, leave it to settle; the quantity of a quart of lee to a pipe of Wine.

A third is only spirit of Wine; which, put into a muddy claret, serves to the refining it effectually and speedily; the proportion being a pint of spirit to a hoghead; but this is not to be used in sharp and eager Wines.

When white Wines grow foul and tawny, they only rack them on a fresh lee, and give them time to fine.

For the mending of Wines that offend in taste, vintners have few other correctives, but what conduce to clarification; nor do they indeed much need variety in the case, seeing all unfavouriness of Wines whatever proceeds from their impurities set afloat, and the dominion of others, their sulphureous or saline parts, over the finer and sweeter; which causes are removed chiefly by precipitation.

For all clarification of liquors may be referred to one of these three causes:

1. Separation of the grosser parts of the liquor from the finer.
2. The equal distribution of the spirits of the liquor, which always renders bodies clear and untroubled.
3. The refining of the spirit itself.

And the two latter are consequents of the first, which is effected chiefly by precipitation, the instruments whereof are weight and viscosity of the body mixed with it; the one causing it to cleave to the gross parts of the liquor flying up and down in it, the other sinking them to the bottom.

But this being more than vintners commonly understand, they rest not in clarification alone, having found out certain specifics, as it were, to palliate the several vices of Wines of all sorts, which make them disgusting. Of these I shall recite two or three of the greatest use and esteem amongst them.

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To correct rankness, eagerness, and pricking of sacks, and other sweet Wines, they take twenty or thirty of the whitest lime stones, and slack them in a gallon of the Wine; then they add some more Wine and stir them together in a half tub, with a parelling staff; next they pour this mixture into the hoghead, and having again used the parelling instrument, leave the Wine to settle, and then rack it.

This Wine may probably be no ill drink for gross bodies, and rheumatic pains; but injurious to good fellows of a hot and dry constitution, and meagre habits.

Against the pricking of French Wines they prescribe this easy and cheap composition: take of the powder of Flanders tile one pound, of roche allum half a pound; mix them and beat them well, with a convenient quantity of Wine; then put them into the hoghead, as the former.

When their Rhenish Wines prick, they first rack them off into a clean and strongly-scented cask or vat, then they add to the Wine eight or ten gallons of clarified honey, with a gallon or two of skim-milk; and beating all together, leave them to settle.

Sometimes it happens, that claret loses much of its briskness and piquantness; and in such case they rack it upon a good lee of red Wine, and put into it a gallon of Sloes or Bullace, which, after a little fermentation and rest, makes the Wine drink brisk and rough.

To meliorate the taste of hungry and too eager white Wines; they draw off three or four gallons of it, and infusing therein as many pounds of Malaga Raisins stoned, and bruised in a stone mortar, till the Wine has sufficiently imbibed their sweetness and tincture (which it will do in a day's time,) they run it through an hippocras bag; then put it into a fresh cask well scented, together with the whole remainder of the Wine in the hoghead, and so leave it to fine.

To help stinking Wines, the general remedy is racking them from their old and corrupt lee; besides which, some give them a fragrant smell or flavour, by hanging in them little bags of spices, such as Ginger, Zedoary, Cloves, Cinnamon, Orris-roots, Cubebs, Grains of Paradise, Spikenard, and other aromatics.

Others boil some of these spices in a pottle of good sound Wine of the same sort, and run up the decoction hot.

Others correct the ill flavour of rank-leed French Wine with only a few Cinnamon canes hung in them.

Others again, for the same purpose, use Elder flowers and tops of Lavender.

Having thus run over the vintners dispensatory, and described many of their principal receipts or secrets, for the cure of the acute diseases of Wine, we shall come to the fourth head, which contains medicaments proper for their chronic distempers; viz. loss of spirits, and decay of strength.

Concerning these, therefore, it is observable, that as when Wines are in preternatural commotions, from an excess and predomination of their sulphureous parts, the grand medicine is, to rack them from their lees, so on the contrary, when they decline, and tend towards palling, by reason of the scarcity of their spirits and sulphur, the most effectual preservative is to rack them upon other lees, richer and stronger than their own; that being from thence supplied with the new spirits, they may acquire somewhat more of vigour and quickness.

I say, preservative; because there is, in truth, no restoring of Wines after they are perfectly palled and dead, for nothing that is past perfection, and hath run its natural race once, can receive much amendment.

But besides reinforcing of impoverished Wines, by new and more generous lees, there are fundry confections, by which also, as by cordials, the languishing spirits of many of them may be sustained, and, to some degree, recruited, of which the following examples.

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When sacks begin to languish (which doth not often happen, especially in this city, where it is drank in plenty;) they refresh them with a cordial syrup, made of most generous Wine, sugar, and spices.

For Rhenish and white Wines, a simple decoction of Raisins of the sun, and a strong-scented cask, usually serve the turn.

For claret inclining to a consumption, they prescribe a new and richer lee, and the shavings of Fir wood, that the spirit being recruited by the additional lee, may be kept from exhaling by the unctuous spirit of the turpentine.

This artifice is used in Paris in the most delicate and thin-bodied Wines in France, and is very probably the cause of that exceeding dulness and pain of the head, which always attends debauches with such Wines.

Nor is it a modern invention, but well known to, and frequently used by the Romans, in the time of their greatest wealth and luxury; for Pliny (Hist. Nat. lib. 14. cap. 2.) takes singular notice of the custom of the Italian vintners, in mixing with their Wines turpentine of several sorts.

The Grecians long before had their Vina Picata and Refinata, as is evident by the commendation of such Wines by Plutarch, and the prescription of them to women, in some cases by Hippocrates, and they were so much delighted with their Vinum Pissites, that they consecrated the Pitch-tree to Bacchus; but I shall next take some notice of the more disingenuous practices of vintners in the transmutation or sophistication, which they call trickings or compassings.

They transform poor Rochelle and Cogniac white Wines into Rhenish; Rhenish into sack; the lags of sack and malmseys into muscadels.

They counterfeit Raspie Wine with Fleur-de-lys roots; Verdea with decoctions of Raisins; they sell decayed Xeres, vulgarly Sherry, for Lufenna Wine; in all these impostures deluding the palate so nearly, that few are able to discern the fraud, and keeping these Arcana so close, that few can come to the knowledge of them.

As for their metamorphosis of white into claret, by dashing it with red, nothing is more commonly either done or known.

For their conversion of white into Rhenish, they have several artifices to effect it, among which this is the most usual:

They take a hoghead of Rochelle, or Cogniac, or Nantz white Wine; rack it into a fresh cask strongly scented, then give it the white parell; put into it eight or ten gallons of clarified honey, or forty pounds of coarse sugar, and, beating it well, leave it to clarify.

To give this mixture a delicate flavour, they sometimes add the decoction of the yellow Clary flowers, or Galitricum, of which drugs there is an incredible quantity used every year at Dort, where the staple of Rhenish Wines was; and this is that drink with which the English ladies were wont to be so delighted, under the specious name of Rhenish in the must.

The manner of making adulterate bastard is thus:

Take four gallons of white Wine, three gallons of old Canary, five pounds of bastard syrup; beat them well together, put them into a clean rundlet well scented, and give them time to fine.

Sack is made of Rhenish, either by a strong decoction of Malaga Raisins, or by a syrup of sack, sugar, and spices.

Muscadel is sophisticated with the lags of sack or malmsey thus:

They dissolve it in a convenient quantity of Rose water, of musk two ounces, of calamus aromaticus powdered one ounce, of Coriander beaten half an ounce; and while this infusion is yet warm, they put it into a rundlet of old sack or malmsey, and this they call a flavour for muscadel.

There are many other ways of adulterating Wines in this city; but because they all tend to the above-mentioned alterations, and are not so general, I shall

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pass them over, and mention the observations of a certain curious author on this subject.

The mystery of Wines consists in the making and meliorating of natural Wines.

Melioration is either of sound or vicious Wines. Sound Wines are bettered,

1. By preserving.
2. By timely fining.
3. By mending colour, smell, or taste.

1. To preserve Wines, care must be taken, that after the pressing they may ferment well; for without good fermentation they become qually, i. e. cloudy, thick, and dusky, and will never fine themselves, as other Wines do; and when they are fined by art they must be speedily spent, or else they will become qually again, and then will not be recoverable by any art.

To preserve Spanish Wines, and chiefly Canary, and therefore principally that which is razie, which will not keep long, they make a layer of Grapes and Giesse, whereby it acquires a better durance and taste, and a white colour, most pleasing to the English.

Razie Wine is so called, because it comes from Rhenish Vine cuttings, sometimes renewed. The Grapes of this Vine are fleshy, yielding but a little juice.

The French and Rhenish Wines are chiefly and commonly preserved by the match, thus used at Dordt in Holland:

They take twenty or thirty pounds of brimstone, rack into it melted, as Cloves, Cinnamon, Mace, Ginger, and Coriander-seeds; and some, to save charges, use the reliques of the Hippocras bag, and, having mixed these well with the brimstone, they draw through this mixture, long, square, narrow pieces of canvas, which pieces they light, and put into the vessel at the bung-hole, and presently stop it close: great care is to be had in proportioning the brimstone to the quantity and quality of the Wine, for too much makes it rough. This smoking keeps the Wine long white and good, and gives it a pleasant taste.

There is another way for French and Rhenish Wines, viz. firing it. It is done in a stove, or else a good fire made round about the vessel, which will gape wide, yet the Wine never runs out. It will boil, and afterwards may soon be racked.

Secondly, for timely fining of Wines. All Wines in the must are more opacous and cloudy. Good Wine soon fines, and the gross settle quickly, and also the flying lee in time. When the grosser lees are settled, they draw off the Wine; this is called racking. The usual times for racking are Midsummer and Allhallowtide.

The practice of the Dutch and English to rid the Wine of the flying lees speedily, and which serves most for French and Spanish Wine is thus performed:

Take of isinglass half a pound; steep it in half a pint of the hardest French Wine that can be got, so that the Wine may fully cover it; let them stand twenty-four hours; then pull and beat the isinglass to pieces, and add more Wine; four times a day squeeze it to a jelly, and as it thickens add more Wine. When it is full, and perfectly jellied, take a pint or quart to a hoghead, and so proportionably; then overdraw three or four gallons of that Wine you intend to fine, which mix well with the said quantity of jelly; then put this mixture to the piece of Wine, and beat it with a staff, and fill it top-full.

Note, That French Wines must be bunged up very close, but not the Spanish; and that isinglass raises the lees to the top of strong Wines, but, in weaker, precipitates them to the bottom.

They mend the colour of sound clarets by adding thereto red Wine, tent, or Alicante; or by an infusion of Turnsole, made in two or three gallons of Wine, and then putting it into the vessel, to be then (being well stopped) rolled for a quarter of an hour.

This infusion is sometimes twice or three times repeated, according as more colour is to be added to the Wine; about three infusions of the Turnsole are sufficient; but then it must be rubbed and wringed.

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Claret over-red is amended with the addition of white Wines.

White Wines coming over sound, but brown, are thus remedied:

Take of alabaster powder, overdraw the hoghead three or four gallons, then put this powder into the bung, and stir and beat it with a staff, and fill it top-full. The more the Wine is stirred, the finer it will come upon the lee, that is, the finer it will be.

To colour sack white: take of white starch two pounds, of milk two gallons, boil them together two hours; when cold, beat them well with a handful of white salt, and then put them into a clean but sweet butt, beating them with a staff, and the Wine will be pure and white.

One pound of the before-mentioned jelly of isinglass takes away the brownness of French and Spanish Wines, mixed with two or three gallons of Wine; according as it is brown and strong, more or less to be used. Then overdraw the piece of Wine about eight gallons, and use the rod; then fill the vessel full, and in a day or two it will be fine, and be white, and mend, if qually.

The first buds of Ribes nigra, i. e. black Currants, infused in Wines, especially Rhenish, make it diuretic, and more fragrant in smell and taste, and so doth Clary. The inconvenience is, that the Wine becomes more heady; a remedy for which is Elder-flowers added to the Clary, which also betters the fragrant thereof, as it is manifest in Elder vinegar, but these flowers are apt to make the Wine ropy.

To help brown Malagas and Spanish Wines: take powder of Orris-roots and salt-petre, of each four ounces, the whites of eight eggs, to which and as much salt as will make a brine; put this mixture into Wine, and mix them with a staff.

To meliorate muddy and tawny clarets: take of rain water two pints, the yolks of eight eggs, salt a handful; beat them well, let them stand six hours before you put them into the cask; then use the rod, and in three days it will come to itself.

To amend the taste and smell of Malaga Wine: take of the best Almonds four pounds, make an emulsion of them with a sufficient quantity of the Wine to be cured; then take the whites and yolks of twelve eggs, beat them together with a handful of salt, put them into the pipe, using the rod.

To amend the smell and taste of French and Rhenish Wines, which are foul: take one pound of honey, a handful of Elder-flowers, an ounce of Orris-powder, one Nutmeg, a few Cloves to an aulin of the Wine; boil them in a sufficient quantity of the Wine to be cured, to the consumption of half, and when it is cold, strain it, and use it with the rod; some add a little salt. If the Wine be sweet enough, add one pound of the spirits of Wine to a hoghead, and give the cask a strong scent. Spirit of Wine makes any Wine brisk, and fines it, without the former mixture.

A lee of the ashes of Vine branches, viz. a quart to a pipe, being beaten into Wine, cures the ropiness of it, and so infallibly doth a lee of Oaken ashes.

For Spanish ropy Wine: rack it from the lees into a new-scented cask, then take of allum one pound, of Orris-roots powdered half a pound; beat them well into the Wine with a staff; some add fine and well dried sand, put warm to the Wine. If the Wine besides prove brown, add three pottles of milk to a pipe: this cures ropy Wine, before it begins to fret.

To mend and preserve the colour of clarets: take red Beet-roots, q. f. scrape them clean, and cut them into small pieces; then boil them in q. f. of the same Wine, to the consumption of the third part; scum it well, and when cool, decant off what is clear, and use the rod.

Firing of Wines in Germany is thus performed: They have in some vaults three or four stoves, which they heat very hot; others make fires almost before every vat; by this means the must fermenteth with that vehemency, that the Wine appears between the staves; when this ebullition, fermentation, and

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working cease, they let the Wine stand some days, and then rack it. This firing is only used in cold years, when the Wine falls out green.

To set old Wine a fretting, being deadish, and dull of taste: take of stum two gallons to a hoghead, put it hot upon the Wine; then set a pan of fire before the hoghead, which will then ferment till all the sweetness of the stum is communicated to the Wine, which thereby becomes brisk and pleasant.

Some use this stumming at any time; some in August only, when the Wine hath a disposition to fret of itself, more or less stum to be added, as the Wine requires.

The best time to rack Wine is in the decrease of the moon, and when the Wine is free from fretting, the wind being at north-east or north-west, and not at south, the sky serene, free from thunder and lightning. Having thus given an account of the different practices of the vignerons, vintners, and Wine-coopers, in the management of their several Wines, I shall next offer a few things which have occurred to me from some observations and experiments, relating to the making of Wines in England.

The Grapes, being ripe, should be cut when they are perfectly dry, and carried into a large dry room, where they must be spread upon Wheat straw, in such a manner as not to lie upon each other; in this place they may remain a fortnight, three weeks, or a month, according as there is conveniency, observing to let them have air every day, that the moisture perspired from the Grapes may be carried off. Then, having the presses and other things in order, you should proceed in the following manner: first, all the Grapes should be pulled off the bunches, and put into tubs, being careful to throw away such as are mouldy, rotten, or not ripe, which, if mixed with the others, will spoil the Wine; and if the stalks of the bunches are pressed with the Grapes, there will be an austere juice come from them, which will render the Wine acid and sharp; this, I fear, has spoiled a great quantity of Wine which was made in England, which, if otherwise managed, might have proved very good; for we find in France, and other Wine countries, where persons are desirous of having good Wine, they always pick the Grapes from off the stalks before they are pressed, though indeed the common vignerons, who have more regard to the quantity than quality of their Wines, do not practise this. But as in England we labour under the inclemency of climate, we should omit nothing of art which may be necessary to help the want of sun.

The Grapes, being thus carefully picked off, should be well pressed, and if it is designed for red Wine, the husks and stones should be put into the liquor, and if the seeds or stones of the Grapes are broken in the press, the Wine will have more strength, which must be put into a large vat, where the whole should ferment together five or six days; after which the Wine should be drawn off, and put into large casks, leaving the bung-hole open to give vent to the air which is generated by fermentation. But it must be remarked, that after the Wine is pressed out, and put into the vat with the husks, if it does not ferment in a day or two at most, it will be proper to add a little warmth to the room by fires, which will soon put it into motion; and for want of this it often happens, where people press their Wine, and leave it to ferment in open cold places, that the nights, being cold, check the fermentation, and so cause the Wine to be foul, and almost ever after upon the fret. This husbandry is much practised upon the Rhine, where they always have stoves placed in the houses where the Wine is fermented, wherein they keep fires every night, if the season is cold, while the Wines are fermenting.

If white Wine is desired, then the husks of the Grapes should not remain in the liquor above twelve hours, which will be long enough to set it a fermenting; and when it is drawn off, and put into other vessels, it should not remain there above two days be-

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fore it is drawn off again; and this must be repeated three or four times, which will prevent its taking any tincture from the husks in fermenting.

When the greatest fermentation is over the Wine should be drawn off into fresh casks, which must be filled to the top, but the bung-hole should be left open three weeks, or a month, to give vent to the generated air, and that the scum may run over; and as the Wine subsides in the casks, they should be carefully refilled with Wine of the same sort from a store cask, which should be provided for that purpose; but this must be done with much care, lest, by hastily refilling the casks, the scum, which is naturally produced upon all new Wines should be broken thereby, which will mix with the Wine, and foul it, causing it to take an ill taste; therefore it would be proper to have a funnel, which should have a plate at the small end, bored full of little holes, that the Wine may pass through in small drops, which will prevent its breaking the scum.

After the Wine has remained in this state a month or six weeks, it will be necessary to stop up the bung-hole, lest, by exposing it too much to the air, the Wine should grow flat, and lose much of its spirit and strength; but it must not be quite stopped up, but rather should have a pewter or glass tube, of about half an inch bore, and two feet long, placed in the middle of the bung-hole. The use of this tube is to let the air which is generated by the fermentation of the Wine pass off, because this, being of a rancid nature, would spoil the Wine, if it were pent up in the cask; and in this tube there may always remain some Wine, to keep the cask full as the Wine subsides; and, as it shall be necessary, the Wine in the tube may be easily replenished. For want of rightly understanding this affair, a great quantity of the choicest Wines of Italy, and other countries, have been lost. A great complaint of this misfortune I received from a very curious gentleman in Italy, who says, "Such is the nature of this country Wines in general, (nor are the choicest Chianti's excepted), that at two seasons of the year, viz. the beginning of June and September, the first when the Grapes are in flower, and in the other when they begin to ripen, some of the best Wines are apt to change, especially at the latter season; not that they turn eager, but take a most unpleasant taste, like that of a rotten Vine leaf, which renders them not only unfit for drinking, but also to make vinegar of, and is called the fettembrine. And what is most strange is, that one cask drawn out of the same vat, should be infected, and another remain perfectly good, and yet both have been kept in the same cellar.

"As this change happens not to Wines in flasks, (tho' that will turn eager), I am apt to attribute it to some fault in refilling the cask, which must always be kept full, which, either by letting alone too long, till the decrease be too great, and the scum there naturally is on all Wines, thereby being too much dilated, is subject to break, or else being broken, by refilling the cask, gives it that vile taste. But against this there is a very strong objection, i. e. that this defect seizes the Wine only at a particular season, viz. September; over which if it gets, it will keep good many years, so the case is worthy the enquiry of naturalists, since it is evident, that most Wines are more or less affected with this distemper, during the first year after making."

Upon receiving this information from Italy, I consulted the Rev. Dr. Hales of Teddington, who was then making many experiments on fermenting liquors, and received from him the following curious solution of the cause of this change in Wine, which I sent over to my friend in Italy, who has tried the experiment, and it has accordingly answered his expectation, in preserving the Wine which was thus managed, perfectly good. He has also communicated the experiment to several vignerons in several parts of Italy, who

who are repeating the same, which take in Dr. Hales's words :

“ From many experiments which I made the last summer, I find that all fermented liquors generate air in large quantities, during the time of their fermentation; for, from an experiment made on twelve cubic inches of Malaga Raisins, put into eighteen cubic inches of water the beginning of March, there were 411 cubic inches of air generated by the middle of April; but afterwards, when the fermentation was over, it reformed a great quantity of this air; and from forty-two cubic inches of ale from the tun (which had fermented thirty-four hours before it was put into the bolt-head) had generated 639 cubic inches of air from the beginning of March to the middle of June; after which, it reformed thirty-two cubic inches of air; from whence it is plain, that fermented liquors generate air, during the time of their fermentation, but afterwards they are in an imbibing state, which may perhaps account for the alteration of the nice Italian Wines; for Wine, during the first year after making, continues fermenting more or less, during which time a great quantity of air is generated, until the cold in September put a stop to it; after which it is in an imbibing state. Now the air thus generated is of a rancid nature (as the Grotto del Cano), and will kill a living animal, if put into it. So that if, during the fermentation of the Wine, there are two quarts of this rancid air generated, which is closely pent up in the upper part of the vessel, when the cold shall stop the fermentation, the Wine, by absorbing this air, becomes foul, and acquires this rancid taste; to prevent which, I would propose the following experiment :



“ Suppose the vessel A filled with Wine, in the bung-hole of this vessel b, I would have a glass tube of two feet long, and about two inches bore, fixed with a pewter socket closely cemented, so as that there may be no vacuities on the sides, and into this tube should be another, of about half an inch bore, closely fixed; the lower tube should always be kept about half full of Wine, up to X, which will supply the vessel as the Wine therein shall subside; so that there will be no room left in the upper part of the vessel to contain any generated air, which will pass off through the upper small tube, which must be always left open for this purpose; and the tube being small, there will be no danger of letting in too much air to the Wine.

“ As the Wine in the lower tube shall subside; it may be refilled by introducing a slender funnel through the small tube, down to the scum upon the surface of the Wine in the larger tube, so as to prevent its being broken by the Wine falling too violently upon it. This experiment, being tried with glass tubes, will give an opportunity to observe what impression the different states of the air have upon the Wine, by its rising or falling in the tubes; and if it succeeds, it may be afterwards done by wooden or metal tubes, which will not be in danger of breaking.”

This curious experiment, having succeeded wherever it has yet been tried, will be of great service in the management of Wines, there being many useful hints to be taken from it, particularly with regard to fermenting Wines; for, since we find that Wines too long fermented (especially those which are produced in cool countries) seldom keep well, so, by letting them stand in a cool place, the fermentation will be checked; which is agreeable to the practice of the Champagnois, who keep the Wines in winter in cellars above ground; but when the weather grows warmer in spring, they then carry them down into their vaults, where they are cooler than in the cellars; and this method of removing their Wines from the cellars to the vaults, and back again into the cellars, as the seasons of the year shall require, is found of great service in preserving the Wines in perfection; for these Wines,

being weak, (when compared with those produced in more southern countries) have not body enough to maintain them, if they are permitted to ferment all the succeeding summer, which the heat of the season will promote where the Wine is exposed to its influence; and this surely must be worth the trial by those who make Wine in this country, since it is the practice of the northern countries, which is the most proper for our imitation, and not that of the most southern.

But after the Wine has passed its fermentation in the vat, and is drawn off into the casks, it will require something to feed upon; so that you should always preserve a few bunches of the best Grapes, which may be hung up in a warm dry room for that purpose, until there be occasion for them; when they should be picked off the stalks, and two or three good handfuls put into each cask, according to their several sizes; for want of this many times people make use of other things, which are by no means so proper for this purpose.

The vignerons of different countries do also put various sorts of herbs into the vat when the Wine is fermenting, to give it different flavours. Those of Provence make use of Sweet-marjoram, Balm, and other sorts of aromatic herbs; and upon the Rhine they always put some handfuls of a peculiar kind of Clary into the vats, from whence arise the different flavours we observe in Wines, which, it is possible, were made in the same manner, and from the same sorts of Grapes. How far this might be thought worth practising in England, a few experiments would inform us; though it is to be questioned, whether these herbs mend the Wine, because it seems to obtain among the vignerons, purely to alter the flavour of their Wines, in order to render them agreeable to the palate of their particular customers; but, however this be, it is yet certain, that there is some art used to alter the flavour of the Wine in most of the different Wine countries of France; for it is the same sort of Grape, which the curious always plant in Orleans, Champagne, and Burgundy; and how different these Wines are in their flavour and quality, every one who is acquainted with them, well knows; and this difference can never be effected by the situation of the places, since there is no very great difference in the heat of those countries; nor do I believe their different ways of making the Wine can alter their flavour so much, especially those of Orleans and Burgundy, where there is little difference in their management; but in Champagne there is this difference from the rest, that they always cut their Grapes in a morning, before the dew is gone off, or in cloudy weather; whereas, the vignerons of all the other places never cut any till they are perfectly dry; which may occasion a great alteration in the Wine.

The method commonly practised to give the red colour to Wine, is to let it ferment a few days upon the skins, which they always observe to press two or three times, in order to make them discharge their contents; but where a deep-coloured rough Wine is desired, there they put a quantity of a certain sort of Grape, whose juice is red, into each vat; this is well known in England by the name of Claret Grape; the leaves of this Vine always change to a deep purple colour as the fruit ripens, and the Grapes are of a fine blue colour, with a flue over them like fine Plums; but the juice of them is very austere, especially if they are not very ripe.

This red Wine will not require to be drawn off into casks more than at first from the vat; for it may remain in the same vessel until it is fit to bottle off, which, I think, should not be done till the Wine is two or three years old; the greater quantity of Wine there is in each vessel, the more force it will have, and so consequently be in less danger of suffering from the injuries of weather, especially if the before-mentioned method be practised; but where there are large quantities of Wine preserved in close vaults, people should be very cautious how they at first enter them, after they have been

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been shut up for some time; because the air of this vault will become rancid from the mixture of generated air proceeding from the Wines, which has often killed people who have incautiously entered them.

Of the concentration of Wines, and other fermented liquors, so as to reduce them in bulk, render them more unalterable and perfect, more durable, and fit for service, carriage, and exportation, by Dr. Stahl; translated by Dr. Shaw.

Dr. Stahl treats this subject to the purpose following:

1. He observes, that Wines, and all fermented liquors, both before and after fermentation, consist not of similar parts, but heterogeneous ones connected together in one certain determinate order. Thus the action and essence of fermentation being a separation and destruction of the former connexion of the subject, and transposing its parts anew, there must of necessity have been a kind of free and durable texture in the subject so disjoined, separated, and new ranged.
2. For example; Grapes, being laid upon dry straw in a cold place, will, for some time after they are separated from the Vine, preserve that texture which gives them their saline, unctuous, and slimy sweetness, which the juice also retains after pressing, and becomes a clear transparent must, without separating itself into the heterogeneous parts; but continuing uniformly and evenly mixed, so as to preserve the different matters it consists of, intimately collected among themselves. And in this firmly connected state it may be kept for many months, if a cask be perfectly filled therewith, and set in a cold place, as is evidently seen in stum.
3. Wine, in the precise, chemical, or philosophical notion thereof, is a saline, clammy, oleaginous matter, diluted with a large proportion of water, whereby it is set at a distance from itself, or expanded; whilst the saline parts are saturated with, and interspersed among the subtiler earthy ones, that make the sliminess; and then together they imbibe, detain, entangle, and hold the grosser oily parts; besides which, there are other oily parts, vastly more subtiler, that, by means of the highly attenuated portion adhering to them, remain as much connected with the water as the rest, and these are what we call spirituous parts; but the connexion of them all together is so strong and durable, that they move for a long time as one body, without separating, if carefully preserved.
4. But if the spirituous part be once drawn away, and separated from the Wine by distillation, tho' it were immediately poured back, or restored to the remaining mass from whence it came, and ever so finely shaken in again therewith, the whole by no means recovers its former taste, odour, and durability, but turns to a confused turbid mixture of a different nauseous taste, unnatural smell, and approaches near to a vapidity.
5. Again; if an inflammable spirit, distilled from the same, or any other kind of Wine, be put to a parcel of Wine that was too saline, or not sufficiently spirituous, the bare addition, or tumultuary admixture thereof, very far from giving the fine and intimate softness of a good Wine, will rather manifest its own burning acrimony, and inodorous flavour, to the smell and taste; and also add a nauseous bitterness to the former tartness and austerity.
6. So likewise any considerable heat, or even a degree of simmering or tepidity, will, by its intestine and subtiler agitation, that barely disturbs the exceeding fine spirituous parts, which are very susceptible of the motion of heat, or disjoins them from the rest, occasioning an alteration of its taste, transparency, and durability, as much as if the spirit had really been drawn off, and poured back again.
7. On the other hand, Wine kept in a cool vault, well secured from the external air will preserve its texture entire in all the constituent parts, and be sufficiently strong for many years; as appears not only from old Wines, but other foreign fermented liquors, particularly those of China, prepared from a decoction

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of Rice; which, being well closed down, and buried deep under ground, continue for a long series of years rich, strong, and generous, as the histories of that country universally assure us.

8. The like is also to be understood of vinegar, after it has thrown off the superabundant earthy parts, and many of the oily ones that presided while it continued Wine; whence the saline ones now get the ascendant, and, as it were, subdue and preside over the spirituous; for good and perfect vinegar, being well stopped down, will continue pure and unaltered for a great length of time.

9. But if it be left open, so that its fine vapour exhales, or its more subtiler part be drawn off from it, and again poured back; in either case it loses its uniform consistence, and particularly its durability, and now directly hurries into vapidity and corruption.

10. If, either by fraud or accident, a larger proportion of water comes to be mixed with Wine, than is absolutely proper for its consistence, and no way necessary or essential; this superfluous water does not only deprave the taste, and spoil the excellence of the Wine, but also renders it less durable; for humidity in general, and much more a superfluous aqueous humidity, is the primary and restless instrument of all the changes by fermentation.

11. It may therefore, doubtless, be useful, and sometimes very convenient to take away this superfluous water from the other part, which strictly and properly constitutes the Wine; but for the method that this may commodiously be done, he first examines those proposed by others for that purpose, and shews the difficulties and insufficiencies, and afterwards proposes an easy way of effecting the thing.

The method of condensing Wines by heat or evaporation.

1. It will be found, by any person who shall make the experiment, that all fermented liquors labour with an over-proportion of water; and that, if a very considerable quantity of it were taken away, they would become not only more rich, but also more durable, provided so much humidity were still retained as is just necessary to preserve the vinous consistence, keep the saline part fluid, and the slimy unctuous parts mixed in, and expanded along with the rest.

2. But as an actual and truly saline matter abounds in Wine and vinegar, and that of an acid, austere, or tartareous kind, when the spirituous part is drawn away, the Wine becomes surprisingly more austere; and when a large quantity of the watery part is separated, this superabundant, saline, tartareous matter coagulates into a crystalline form, and falls to the bottom, or strikes to the sides of the cask; for the subtiler oily matter, which makes the spirituous part in Wine, blunts and takes off from a tartareous acidity, in the same manner as the addition of rectified spirits of Wine blunts, sheaths, and dulcifies, the corrosive and acid spirits of nitre, salt, and vitriol.

3. But this tartareous salt also abounding with an over-proportion of a gross unctuous matter, cannot be dissolved or diluted without a very large proportion of water; which being taken away, it presently concretes into dry solid crystals, as is the known case of cremor tartar.

And hence proceeds the effect before observed, viz. that the acidity and roughness of the Wine manifest themselves the more, when the Wine is deprived of its spirit.

And this is an experiment familiar in the kitchen, when Wine is burnt or used in sauce; for boiling always gives it a much greater degree of austerity.

4. And when this water is, even by distillation, plentifully drawn off from Wine, not of a terrestrial and chalky, but of a tartareous nature, a beautiful tartar will be found to crystallize among the remaining mass, and destroying those properties thereof, which ought to be preserved.

5. For, first, the spirituous part is the life of the Wine, and all fermented liquors; and not only keeps them together,

together, embalms the whole, and renders it durable, or not subject to corruption, but also, in great measure, gives them that aromatic, refreshing, and restorative virtue and effect they have upon the human body.

6. This inevitably proves the case, whenever Wine is evaporated or distilled, which constantly requires a degree of heat sufficient to convert water into vapour; whence the spirituous part, being much more volatile than the aqueous, flies off together with, or even before it, and thus leaves the Wine dissolved in its texture, and without its soul.

Upon which the remaining, saline, slimy, unctuous mass is so disturbed, as no longer to remain connected, but immediately turns thick and turbid, and afterwards runs impetuously into a kind of corruption, attended with vapidness and ropiness.

All which circumstances abundantly shew the method of exhalation to be absolutely unfit for condensing Wines, as it so many ways destroys the whole vinous texture and compages.

Of the method of condensing Wines by percolation.

1. That Wine, strictly and properly so called, is of a grosser and thicker body than water, or that the essential and truly constituent parts of Wine may be considered as separate and distinct from a superfluous and copious aquosity, appears a priori and a posteriori.

2. For, first, it is rational to conceive, that a matter consisting of a collection of saline, slimy, and unctuous parts, brought into one mass, should have a grosser consistence than pure and simple water.

3. And next, this grossness of the proper and essential particles of Wine manifests itself to the eye,

1. In those diseases of Wine, wherein they become viscous and ropy, when they not only lose their transparency, but may be drawn out and extended like a mucus; and do not, upon pouring out, then fall in drops, but run down in long ropy strings.

2. It appears again to the eye, in vinegar grown mothery, mucilaginous, and tough, so as sometimes to afford a dense skin, like leather; which cannot well be supposed to proceed from the water, but from the more proper and essential parts of the Wine it was made of.

3. But because these inspissations may possibly be attributed to some supernatural disorder of the Wine, we may add, that our method of concentration exhibits this grossness of parts to the eye, whilst the Wine remains in a perfect state, free from its superfluous aquosity; for here it appears much denser, and deeper in colour; less fluid, less thin, less transparent, and in every respect of a thicker and higher consistence.

4. Lastly, This is still more evident in malt liquors, which being concentrated in our manner, taste full and thick, almost like oil in the mouth, and pour out like that, or a thin syrup; being at the same time also heightened or concentrated in colour.

From the preceding phenomena it should seem natural, that these different parts of Wine, which vary so much in consistence and tenuity of matter, might be separated from each other by a commodious percolation: so that the aqueous parts, which appear the finest, should run through the pores of a proper strainer, and leave the grosser behind.

But the practice hereof is clogged with great difficulties; for,

First, those thin liquors, which have a manifest and copious saltiness, as Wine has, are either so attenuated, and their gross part, however thick in comparison of water, is yet so subtle and penetrating in itself, as at the same time to pass the pores of any ordinary strainer; at least, such liquors will, along with their aqueous, transmit the finest and most delicate of all their parts, and leave the more sluggish, the truly grosser, or those most tending to ropiness, behind.

It must also be observed, that most kinds of Wine besides their genuine, substantial, rich, and essential

part, have constantly joined with them some foreign, superfluous, and prevailing gummy or mucilaginous matter; which, the more it inviscates the nobler part, the thicker and grosser it actually becomes; whilst the other finer portion, which is not clogged with such a load, remains more penetrating and active.

And hence also the difficulty of condensing Wines by percolation is increased, as this subtle spirituous part passes the strainer along with the water.

A contrary difficulty attends the use of a close strainer, arising from the gross mucilaginous particles, either accidentally interspersed in the Wine, or cleaving to this and other fermented liquors, but especially malt-drinks; for these viscous, tenacious, and clammy particles presently clog and stop the pores of the strainer, and by that means hinder the thinner and more watery particles from getting away; and the natural tenacity and clamminess of liquors prepared from malt, honey, and the like, communicates in the manner of a mucilage, such a ropiness, even to the superfluous water, and diffuses and expands itself so much therein, that the water itself is thereby thickened, and rendered much less apt to flow.

A third difficulty attends this method by percolation, viz. that although it were possible to make the separation, yet the work would proceed so slow, that the more subtle, fine, brisk, volatile, and spirituous parts, which give the pungent taste and odour, might, in the mean time, exhale, and leave the remaining Wine flat and vapid; or if this inconvenience could be prevented, yet, in so tedious an operation, some prejudicial, fermentative operation would, in all probability happen.

And, after all, there would still remain a question, as to the matter to be used to the strainer; which they who have never made any experiment that way might little dream of.

For, as the common filters or strainers are generally made of paper, linen, or some kind of cloth, all these readily communicate and impress a foreign disagreeable taste to the liquor, especially to Wine if intended for condensation in this manner.

And it may seem surprising, that even a momentaneous passage of condensed Wine through the cleanest linen, will give it a remarkable and very disagreeable taste of the bag, that shall continue for many months. This happens in a much greater degree to condensed Wine, after the same manner as the highest rectified spirit or alcohol of Wine will, in many cases, perform a solution, immensely quicker, and more powerful than such a phlegmy spirit, though mixed but with a tenth proportion of water; for so our concentrated, or, as we may call it, our rectified Wine, being freed from its superfluous phlegm, has a more powerful, more immediate, and more intimate effect, upon the parts of the cloth and other bodies, by means of the concentration of its spirituous and saline parts, than when its efficacy is weakened by being diluted with water.

This method, however, by percolation, though no way sufficient to free the Wine of all its superfluous water, may yet be of some service, if applied with due regard to the difference there is between fermented liquor, especially in point of consistence; and therefore some faint or imperfect imitation of our method may be had by means of such paper filters, or other common strainers.

And, in this view, the common tavern trick, with a piece of liss, when dextrously performed, might be of some service; for if a long, thick, woollen string be first soaked in water, and then one end of it plunged into Wine, whilst the other end hangs a great way down without the glass, it will, in an imperfect manner, draw away the water from the Wine.

But all these, and the like attempts, are trifling and useless, in comparison of our easy, expeditious, and perfect manner of effecting the thing; to which we next proceed.

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Of the method of condensing Wines, and other saline spirituous liquors, by cold.

Having shewn above, what effect the motion of heat, and the action of fire, have upon all fermented liquors, and especially upon the finer parts of them, and more directly upon those of Wine; and how much they contribute to dissolve the intimate union of vinous fluids, and change their whole nature, which consists in that union, and connection; we pass on to the consideration of cold, which, being opposite to heat, may be supposed to have different effects; or at least, such as better suit the present purpose.

If any kind of Wine, but rather such as has never been adulterated, being in a considerable quantity, as that of a gallon or more, exposed to a sufficient degree of cold in frosty weather, or in any place where the ice continues all the year, and so be brought to freeze; the superfluous water contained in the Wine will be turned to ice, and leave the proper, and truly essential part unfrozen, unless the degree of cold should be very intense, or the Wine but weak and poor.

When the frost is moderate, the experiment has no difficulty; because in that case, not above a third or fourth part of the superfluous water will be frozen in a whole night; but if the cold be very intense, the best way is, at the end of a few hours, when a tolerable quantity is formed, to pour out the remaining liquor, and expose it to freeze afresh by itself. And

1. Because, when the quantity of ice grows large, more of the concentrated Wine will be apt to hang and lodge in it.

2. Because it would otherwise require a longer time to drain away from the ice.

If the vessel that thus by degrees receives the several parcels of condensed Wine, be suffered to stand in the cold freezing place where the operation is performed, the quantity lying thin, in pouring out, or otherwise, will be very apt to freeze anew; and if it be set in a warm place, some of this aqueous part thaws again, and so weakens the rest.

The condensed Wine therefore should be emptied in some place of a moderate temper, as to cold and heat; where neither the ice may dissolve, nor the vinous substance mixed among it be congealable. But the best experiment of all is, to perform the operation with a large quantity of Wine, as that of several gallons, where the utmost exactness or prevention of all waste need not be so much regarded.

By this method, there freezes about one third of the whole liquor, and is properly the more pure aqueous part thereof; insomuch that when all the vinous fluid is poured off, to be exposed to a farther concentration, the ice remaining behind, upon this first emptying, being set to thaw gently in a warm place, dissolves into a perfectly aqueous fluid, retaining only a light scent, but extremely little of the taste and colour of the Wine.

If the Wine, now once concentrated, should, by longer continuance in the freezing cold, be again congealed to the utmost (unless the cold were very severe,) and then again be drained from the ice, there soon after falls to the bottom of the glass it is poured into, a gross white, and shining powder or tartar; and even the icy part, remaining behind, deposits a little more of this powder, after thawing, and again, the same vinous concentrated matter does the same upon standing a few days or hours; but the more of it, as the Wine was austere or genuine, neat, and unadulterated with sugar, brandy, or the like.

The ice of the second operation differs in no respect from that of the first, provided the vinous matter be perfectly drained away from it, before the ice is set to melt; whereby it runs into the same kind of phlegm, excepting only when the Wine was less spirituous, that it tastes a little more saline than the water separated by the first operation.

The part which has escaped being frozen in both

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operations, is a real concentrated Wine, as appears by its colour, consistence, taste, and smell; for it has now all those properties in a greater degree, and a much narrower space, than when so largely diluted with superfluous water; and therefore becomes a much nobler and richer Wine, than without such a contrivance could possibly be procured; for as by this means two third parts of phlegm are taken away, in the better sort of Wine, or three fourths in the weaker, what remains must needs become highly rich and saturate.

This operation, though it be perfect in Wine, does not succeed altogether so well in rich malt liquors.

Thus, for example: Having by several concentrations reduced a full gallon of strong malt liquor to the quantity of a pint and a half; the ice separated from it in the first concentration, resolved into a liquor somewhat of the colour and taste of small beer, and that obtained at last, might have almost passed for small beer, though a flashy watery taste manifestly predominated in it; but the part that remained uncongealed was extremely rich, and for consistence and taste, far exceeded the famous double Brunswic mum.

In point of strength or spirituousity, it seemed perfectly aromatic, and nobly flavoured; a thing not found in common malt liquors; and for consistence, it resembled a dilute syrup, and with a pleasing softness, sheathed the acrimony of the spirit, and concealed the bitterness of the Hop, which before was very considerable.

The mucilaginous nature, predominant in all malt liquors, here occasions a greater inaccuracy, as not suffering the condensed part to get clear and run from the ice; but as this liquor is cheaper than Wine, the loss is less considerable; and not only so, but if the operation were to be performed in large, the thawed liquor might be commodiously employed in a fresh brewing; so that, with a slight encheiresis, all manner of loss may be prevented.

And thus likewise the phlegm of Wine, separated in the operation, may, by a proper ferment, be converted into good vinegar, with a great deal of ease, and moderate profit.

What a large quantity of water abounds in vinegar, is well known to those that are skilled in chemistry; so that a great quantity of vinegar will saturate but a small one of alkaline salt; and again, a deal of vinegar is required to dissolve a little quantity of metal.

A pint of the strongest vinegar will scarce dissolve above two drams of iron; or saturate more than the like quantity of good salt of tartar; but our method of condensation effectually remedies this inconvenience; and so far deprives the vinegar of its superfluous water, and collects its acetous penetrating sharpness, as to render it extremely powerful; thus throwing out five or six parts of useless phlegm, that tastes scarce perceptibly acid, and, at the same time, retaining the strength and virtue of the whole, in the part remaining uncongealed.

The advantages of the method of condensing Wines by cold.

It is certain, that the best and noblest Wines, if exposed for several days to the warm open air of the summer, out of a vault, or other proper receptacle, will inevitably corrupt and spoil, throwing a mouldy and mucilaginous matter to their surface, and acquiring a degree of stench or vapidty, or at best, turning to vinegar. On the contrary, the Wine condensed in our manner suffers none of these changes, upon being so exposed; but remains for a long time not only uncorrupted, but even unaltered, as we have experienced for several years.

And as this difference is owing to nothing more than freeing the Wine of its superfluous water; it may hence be fairly presumed, that water alone is the principal or immediate instrument of all the fermentative motions and changes of vinous liquors.

We

Except Madeira wine which grows better by such exposures.

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We condensed, in our method, a gallon and a half of poor, weak, austere, and acid Wine, to about a quart, in the winter of the year 1696, and put it into a glass bottle, whereof a third part remained empty, and stopped it only with a hard wreath of paper; and thus it stood for the space of two years in my bed-chamber, where, during the summer, when the weather was fair, the windows were open all day long; and where also, in the winter, other aqueous liquors froze. During this time, it was often opened, and some of it poured out, both to taste, and otherwise to use; and yet all this time it neither grew mouldy nor sour, nor suffered any separation of parts; only deposited a small quantity of tartar, but retained its original consistence and taste entire; except some small change in both for the better.

In the same manner we concentrated a somewhat better kind of Wine to a little more than a fourth part; but the bulk of this did not keep so well as the former, as having many more tasters, than the austere and disagreeable sort.

When it was by degrees tasted away to half a pint, I put the remainder into a glass, and tied it over with a piece of bladder; then set it in the same place, near the former, but could not prevent its being sipped away by degrees, till only about three ounces were left.

This small quantity stood all the summer, barely covered with a loose bladder, without alteration, or growing in the least mouldy or acid, and long after retained its most grateful taste, and quick smell; only the latter was somewhat weakened thro' the bottle's remaining untied down; and that under this inconvenience it should continue so perfect and entire is surprising.

I had in the winter of the year before, condensed a very small quantity of the same sort of Wine to half an ounce, and put it into an ounce phial, which remained lightly tied down all the next year in my ordinary stove room, where it kept without corrupting, till after the end of the winter; when by the unequal, and sometimes violent heating of the room, it became vapid and mouldy.

A parcel of vinegar concentrated after the same manner in the winter 1694, and by that means brought to a corrosive degree of sharpness, which rendered it unfit for the table, stood in the same room with the concentrated Wines, for three whole summers and winters, without any manner of tendency to corruption, or the smallest signs either of mouldiness or rousiness.

These examples and experiments sufficiently shew, that liquors thus concentrated, may for a long time be kept in a state of perfection with little care.

But there are some particular changes of Wines and vinegars, thus concentrated, that happen in process of time.

1. Wines upon being thus concentrated, seem to acquire a more austere taste, than they had originally; and no wonder, as the concentration brings their saline and rough matter into a third or fourth of its original compass; so that this is no new addition or increase of the rough taste, but perhaps some degree of mitigation thereof, in regard to the closeness whereto this rough matter is brought; which, of itself, ought rather to multiply the effect in a greater proportion.

The change may be conceived owing to this, that all Wines are observed to grow mild and soft by long lying; which effect is greatly promoted in them by a successive separation of their tartar, and a gentle evaporation of some part of their water; occasioning that necessity we find of frequently filling up the casks in the summer months; but in our concentrated Wine, though some tartar be successively separated, yet there is found no concurrent evaporation; for the concentrated Wine grows soft and mellow in a well-stopped glass, where no sensible diminution of the quantity is perceived.

But the effect proceeds principally upon a closer com-

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bination of the grosser with the spirituous part, which now wanting water, successively throws off the grosser tartar from the rest of the mixture.

But besides this, there seems to be another remarkable change incident to our concentrated Wines, not only in the taste, but abundantly in the smell; for although that very austere Wine above-mentioned had a much milder taste the third year than the second, yet its specific odour perfectly resembled that of sack or Canary, so as to be mistaken for it, from the smell alone, by good judges, who were acquainted with the original flavour of the Wine, from whence it was concentrated.

Nor is this change of odour peculiar to Wine alone; but concentrated vinegar participates somewhat of it, and was observed for some time to lose it, in great measure, upon being left long-stopped only with paper, and the bottle often poured out.

And therefore as it is plain, that Wines, and all other fermented liquors, become much more durable by concentration; and yet this durability is here confirmed and proved from small and inconsiderable quantities, wherein they always retain their goodness; it is obvious, that if the operation were performed in large, a great bulk of the liquor thus concentrated would be still immensely less subject to alteration from the air and heat, which are the two great incentives to fermentative motion; and that if such small parcels suffered no change for the worse, much less would the larger.

But as these concentrated liquors, by reason of their considerable proportion of saline and fine spirituous parts, have a less tendency to dissolution and corruption; so, on the contrary, the aqueous part, separated from them, has a very strong tendency thereto; for as it takes from the Wine, and carries off with it a little of the mucilaginous and unctuous part, and yet is almost wholly a mere moveable fluid water, that is, the most active instrument of fermentative motion, it cannot but presently fall into corruption.

This business of congelation is not only applicable to immediate profit, but also paves the way to certain matters of curiosity, and shews one particular, which, though not new, but anciently common and familiar, has yet grown strangely into disuse through the indolence of mankind.

As to the point of immediate use, it needs no explanation; for he must be very dull indeed, who does not immediately perceive, that Wines, &c. by this method may be reduced to any degree of vinosity, strength, or perfection.

Thus, for example: If a Wine of a moderate strength have a third part of its water taken away, in the form of ice, by congelation, the remaining part will thereby be doubled in strength and goodness; for if in the better sorts of Wines we allow, as we may, one third part to be good, or truly vinous, and two third parts to be water, then that one third good part is divided among the two aqueous parts; whence, if one of the two aqueous parts be taken away, that same third part before divided between the two waters, now remains collected or condensed, in a double proportion, along with but one of them.

But if this concentration be carried up to the utmost, and practised in a large quantity, with a somewhat intense cold, it may perhaps reduce good Wines to a sixth; and this small quantity might commodiously be used as a quintessence, to meliorate, improve, and even specificcate, smaller and low flavoured Wines.

To conclude; as to the direct and immediate use of our method of concentration, he who has the secret, by means of a little, dry, powdery body, of turning water into Wine, will not perhaps easily divulge the capital use he may make of the experiment.

WINE PRESS. [A description of the great taillon or famed Press.] The Press, which is a machine, or moving power, contrived to squeeze the juice out of Grapes, consists of an assemblage of many pieces of timber, placed after different dispositions, which compose

pose three bodies of timber work, closely joined to the axis, which serves as a swing, whereby it may be moved by the vice.

The great Presses are thirty or thirty-three feet long, and twelve or sixteen wide. To make one of these machines, they first dig a pit in the ground about four feet deep, and sixteen feet square, in the most commodious place where the Press is designed. In the middle of this hollow they build a small pile of masonry the whole length, for a foundation, two feet thick, and three feet high, in such a manner, as to have only one foot below the surface of the ground; then they make a parallel wall, to surround the Press from the right to the left, to the extremity of the pit, at an equal distance from the pile in the middle, for supporting some of the timbers, and to prevent the earth from falling down into the pit. The space between these three little walls of three feet depth, is necessary to give air to the wood, to prevent its rotting.

The wall, which ought to be from the sides of the beams (which may be placed from the right to the left of the Press, according to the greatest convenience of the place,) should be deeper than the hollow of the beams, which shall be explained hereafter; and that which is contrived on the bent side of the beams, should be thicker than the square of the bason, which will be more easily comprehended by what follows.

Upon the little wall of the middle, they lay a piece of timber lengthwise, which they call a false stilling; upon this, to the side of the hollow beams, they place a ground plate, which is supported by another pile of masonry, which is joined close to the beams, and the piles which they cross; all these pieces should be laid level, in order to support four stillings, which are placed across them at an equal distance. These pieces ought to extend beyond the wall of the bason, on the side of the beams, about three feet, and be laid upon the piles, to hinder them from rising; there must always be allowed a declivity of three or four inches from the front to the four stillings, in order to facilitate the draining of the wine into the cask, which should be placed under the middle, in the fore part of the bason, to receive it from the side where the holes are bored.

They afterwards place upon these four stillings, cross the bason of the Press, some pieces of wood called maye; these should have their tops level with the top of the stillings, and ought to be cut in notches of four inches in length on both sides the bason, for receiving the maye in such a manner, that they may be fastened on each side with wedges, after having put in the middle of the joints potters-earth and Moss, to prevent the wine from getting out at the crevices; these pieces of maye are simply joined together without fillets or notches, that they may the better close the two ends to the middle of the quoins their whole length, between the stillings and the side of the last pieces of maye; these pieces should be raised in the middle with a ridge, to make a gutter in each joint, to facilitate the draining of the wine; they also make for the same purpose, a ridge or furrow all round the extremity of the pieces of maye.

In the place appointed for the beams, on the right or left of the bason, they make a hole big enough to erect a frame of masonry twelve feet deep, eight long, and five broad. One of the three piles of masonry, which supports the bason, serves there instead of one side of the wall to the beams, which are driven into the ground at the bottom of the said frame, twelve feet deep, and are fifteen or sixteen feet above the level of the ground; these they join with the piles which cross them, upon which they put the beams, which are all joined by cramps of wood, except the last, to which the stillings serve instead of braces. They afterwards erect the masonry, in which they inclose the ends of the piles, as also those of the braces, to prevent the beams from rising; these piles ought to be placed contrary to the stillings, which surround or cross them every three feet, and dove-tailed into

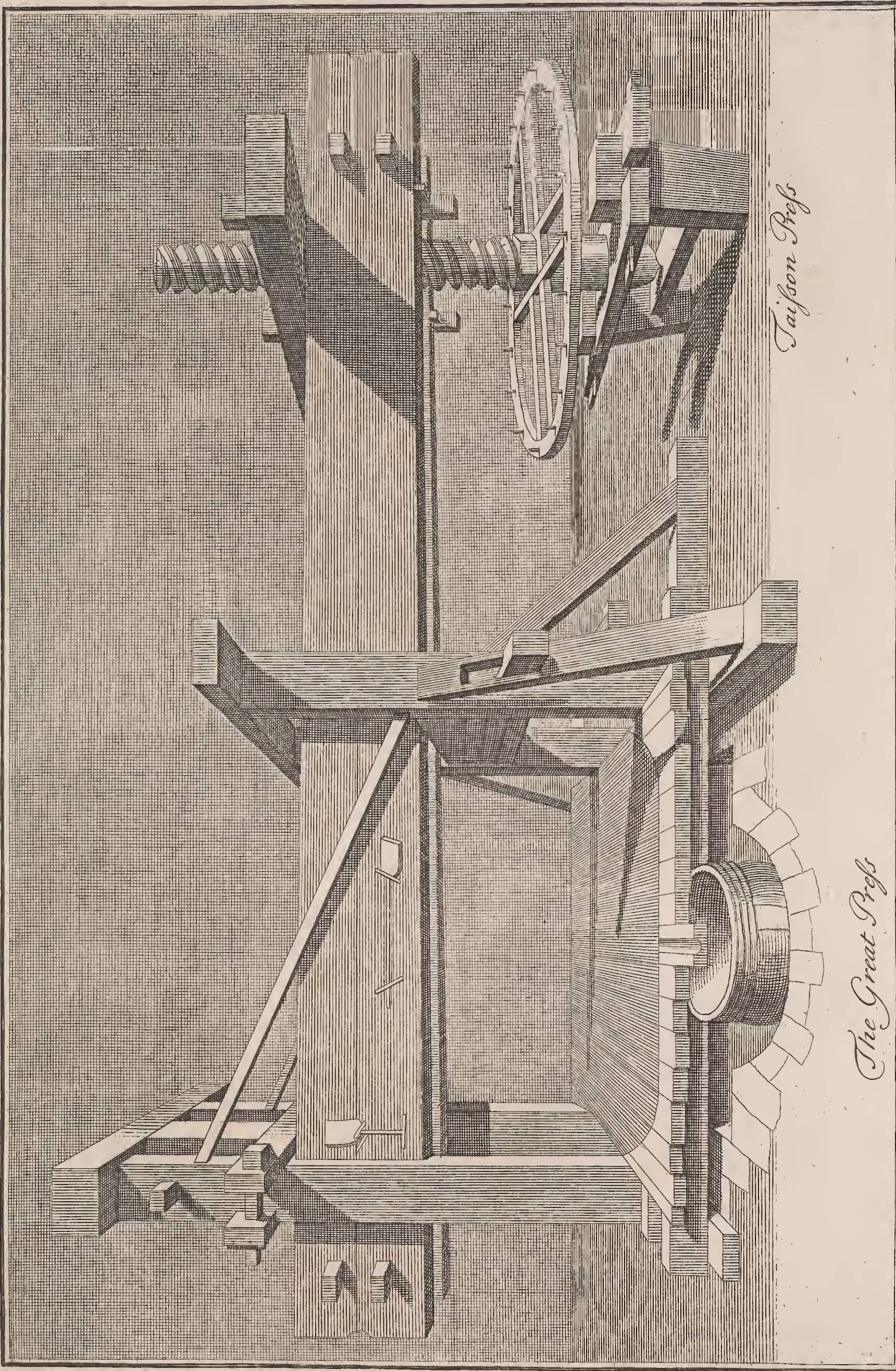
the square supporters; the space left between the masonry they do not fill up, that the beams may be preserved from rotting, and that, if occasion be, they may go down into the pit. The beams ought to be laid in such a manner, that their sides may occupy the middle of the bason, and they should incline two inches beyond it; the front and sides must be made smooth and even, but the back and tops must be left rough; they make a-top, under the pieces of maye, a ledge of two or three inches, for support to the carriage; the top of the beams is joined with a cross beam, under which is a spindle supported by a diagonal beam, on which all the force and resistance of the Press bears; this diagonal beam should be closely fastened with nails and girders under the heads of the beams. In the middle of the other side of the bason, they put upon the ground plate, between the ends of the stillings, two false beams a little distance from the true ones, because it is on this side that the axle tree is notched to receive the beams, to prevent their recoiling back; these are a little enlarged towards the false beams; they sustain these with four cross pieces or strong jambs, two on the front, and two on the sides, which abut against them, and keep them in their places; these cross pieces are borne by the ground plate and the posts, and let in at the other end just to the middle of the false beams; these ought to be bored about four feet high, that the moving pins may be put in there for the beam to rest upon; these false beams should have holes at the bottoms, to receive the wooden pegs, which cross the ground plate, and are cut to half their thickness, that they may be capable to enter the notches, and be joined with keys and pins where they cross the false beams; they likewise bind these beams at the top with a cross beam, and they sustain them again at the bottom with two cross pieces on their sides; these cross pieces are placed upon the posts, which are joined into the ground plate by a dove-tail, and are borne up horizontally by a small piece of masonry of their own size, which is chiefly hid in the ground; there must also be on each side a large cross piece to cross the bason, which binds together the false beams with the true, both before and behind; these they fasten to the top of the beams, allowing them a foot and a half declivity to the place where they are mortised into the false beams.

They also make in the ground, on the side of the false beams, ten feet from the bason, a pit twelve feet deep, and ten feet square, to place the two blocks, which should join at bottom, and be separated by the great ends, about two feet above the surface of the ground, in such a manner, that the screw may be able to play between them; these must be joined at bottom to the piles by a strong dove-tail, and the piles joined with braces; and near the top, about fifteen inches from the head, they should be bound with girders and pins, to keep them asunder, and prevent their parting. The space between the blocks and the piles must be filled up with earth, which should be well rammed; these girders should be let in seven or eight inches to the body of the blocks.

In the middle of the girders there should be a hole to put in the screw, which should there descend perpendicularly, and which is rounded to this place, and lessened to a third part of its thickness; and a foot lower than the girders ought to be a rail placed as a support, from bottom to top, in a slope, for a rest to the screw; there should be on this rail a plate of iron, and an axis to the screw, for its play; the screw must be twelve feet long, and thirteen inches thick at the top; the screw-tap, or the extremity of the spiral line, ought to be three inches and a half, and should form an exact square; the screw should pass cross a wheel, which is placed three feet from the surface of the ground, and which in this place should be square, and about an inch and a half of its thickness pared off for the play of the wheel; this wheel should be joined with spokes and curb, athwart,

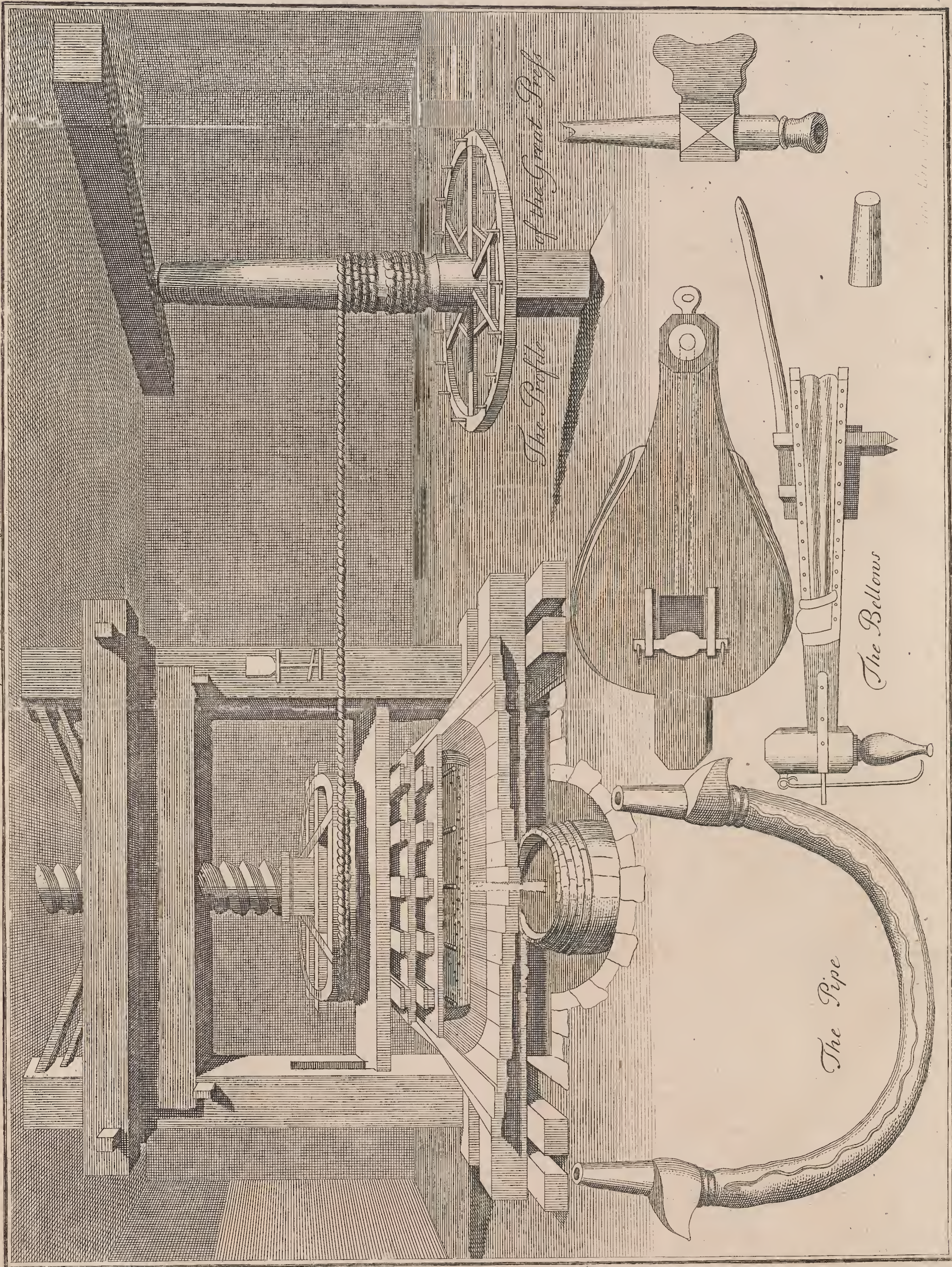
into

Plan of the Great Wine Press.



The Great Press

Tajson Press



The Profile of the Great Press

The Bellows

The Pipe

into which they put divers pegs, that they may be able, with five or six men, to give it the necessary motion.

Lastly: There should be placed, at five feet from the bottom of the bason, two great beams, which must pass between the true and the false beams; these must be both squared or pared away at the great end, on both sides where the beams touch, where they let them into a notch, to prevent their coming out; and at the back part they put a key, to secure them from being displaced (for they cannot put them into it;) but nevertheless, in such a manner, that they may play between the beams, without changing their position; these beams should be well fitted to their bed, and joined with keys, that they cannot part from each other; for they should open insensibly from the false beams, where they ought also to separate to the right of the screw, to give place for it. Upon the end of these beams must be joined the nut of the Press with moveable keys, that by this means it may be raised or lowered, so that the beams may rise and fall as a kind of swing, which has the keys for its center, which are the false beams, where the great beams rest, and the bag which is upon the bason. When they press, before the pressman raises the beam, by means of the screw, they lower it on the sides of the false beams a little, that they may force the quoins between the beams and the spurs, which is upon the false beams, then they lower it with the same screw from the side of the false beams. After they have moulded the Grapes with the free poles, the planks, and the nave, by the help of the wheel which moves the screw, they press the bag strongly.

These beams should be two feet and a half thick, and if that is not big enough, they put two upon each other, and sometimes three, if it be necessary; these they join together with nails in different places, both on the bed, and in the front, that they may work together, as if there were but two; and they raise at the end of the Press, on the side of the false beams, a small hanging scaffold or steps to go up to strike the quoins.

Of the great framed Press.

This sort of Press is made like the other, except that instead of blocks, they use a frame. They make a great pit in the earth twelve feet deep, and nine feet diameter; and, to support the earth, they build a wall of stone all round it, in the form of a well, which ought to be seven feet diameter, that they may place in this space a frame of wood work of a square figure, joined together with posts, joists, ground-plates, and rafters, like a St. Andrew's cross. In this frame they put a solid stone of about three thousand weight; then they join the screw to the center of the frame, that they may be turned together, and so keep the beams upon the stock of the wheel, to press the Grapes, in such a manner as if one man was suspended at one end of a pole, which is made fast at the other, and in the middle there is something to press. At about two or three feet from the ground is a wheel, by means of which, and the weight of the frame, they make the screw descend, which lowers the beam. The frame should be ten feet high, and four feet nine inches square on each front. Great care should be taken of the block Presses not to screw them too hard, lest it break the beams, and split them to pieces, nothing being of greater force than a screw. You must not fail to make the dove-tails very exact, but above all, the screw and the nut should be made artificially to their work.

These great Presses make, at one vat or stowage, from twenty to twenty-five pieces of Wine. One may make it less by a fourth part, and it will press as well, when there are not above ten or fifteen pieces of wine. In this case the pieces should be proportionably diminished in the bigness from what has been described.

The names, length, and thickness, of the pieces which compose a great Press.

The main beams from thirty-two to thirty-five feet long, and one with another, from two feet and a half to three feet thick.

The cheeks or side beams twenty-eight feet long, about two feet thick at the bottom, and eighteen inches at the top.

The piles twelve feet long, and twelve or thirteen inches thick. It must be observed to make these with counter dove-tails to those of the cheeks; the first is placed at fifteen inches from the bottom of the cheeks; one ought to put three from the top, to that which is in the ground, and the latter should be even with the top of the false stiller.

Upon the piles of the cheeks, and upon those of the blocks, are placed braces of wood nine feet long, and about nine or ten inches thick, to bind them together.

The stillers six feet long, and about fifteen or sixteen inches square.

The ground plate eighteen feet long, about eighteen inches broad, and fifteen inches thick.

The false beams fourteen or fifteen feet long, about thirteen or fourteen inches broad, nine inches thick at the bottom, and six at the top; these ought to be planed to the size of the keys, to support the main beam.

The cross piece of the false beams six feet long, four inches broad, and nine or ten thick.

The keys of the beams, to the direction of the worm, five feet and a half long, eight inches thick towards the head, but reduced to half the size in the remaining length.

The pegs of the keys fourteen inches long, about five broad, and at least one and a half thick.

The two cross timbers of the false beams about eight feet long, four or five inches thick, and the same breadth of the false beams.

The two other cross timbers of the false beams nine feet long, and about eight inches thick.

The posts six feet long, and about eight or nine inches thick.

The pieces of maye, which are at the bason, twelve feet long, about nine or ten inches broad, and six thick.

The great cross timbers, put as a band between the false beams, six or seven inches thick.

The two blocks fourteen feet long each; about sixteen inches thick at the head, and twelve at the bottom.

The screw fifteen inches at the bottom before it is squared, thirteen inches, according to the foot of the screw which forms the spiral line, and twelve feet long.

The wheel ten feet diameter, with spokes of four inches thickness, the same as the ribs, upon which are wooden pegs for four or five inches high, and one diameter, admitting eight or nine men in the circumference of the wheel.

The nut of the Press six feet long, two feet broad, and fourteen inches thick, which ought to be crested with iron.

The cross piece of the cheeks five feet long, about a foot thick, and of the same breadth as the top of the cheeks.

The spurs, which are placed under the spindle, between the two cheeks, should be of the same breadth as the cheeks, and thirteen or fourteen inches thick.

The girders, which ought to embrace the top of the cheeks, must be two inches higher than the under part of the spurs, one foot broad, and about five inches thick.

The spindle two feet high, and twelve or fourteen inches thick; this is placed between the spurs and the cross piece, and crosses the cheeks and the spindle with a key, which ought to be worked very

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exact, for there it is the whole force of the Press resides.

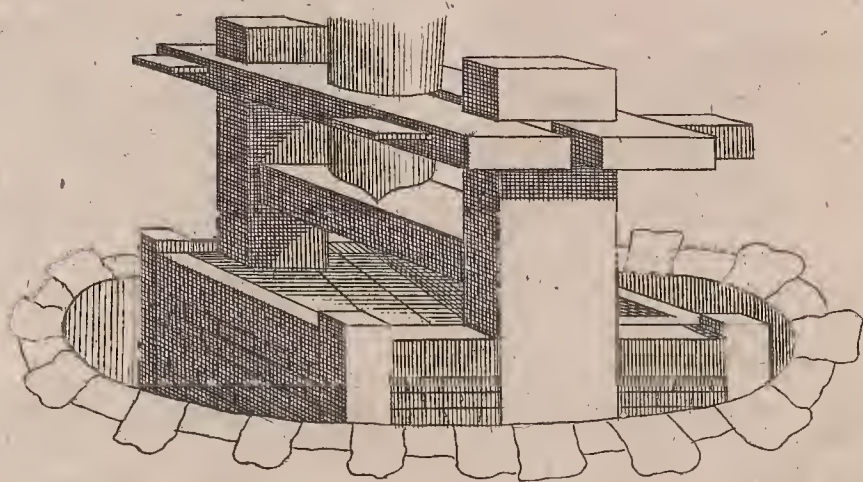
The quoins two feet long, about nine or ten inches broad, and six or seven thick.

The frame, in the framed Press, ten feet long or deep, and four feet nine inches square, with four fronts.

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The nave eight feet and a half long, about five inches thick one way, and six the other.

All these timbers should be Oak, except the screw, which should be Elm, which will last longer, and the spindle should be of Walnut. One may make the most part of these timbers longer or shorter, according to the size of the wood made use of



The Small Framed Press

The description of a slight Press.

This sort of Press is much less chargeable than the others, and it also presses a much less quantity of Wine, but it is nevertheless of great use for private persons, who have no great vintage, where this will be sufficient, for it will make eight or ten pieces of Wine at each tunning.

The construction of this slight Press is much the same with that of the other Presses, but I shall explain wherein they differ.

The pit which is made in the earth ought to be four feet deep, fourteen broad, and eighteen long, more or less, according to the size of the intended Press. They make three little walls of free-stone cross the Press, which occupies the bottom of the square of the basin; they make the walls in the middle two feet, and those on the sides two and a half thick. An opening must be left in the middle of each of the side walls, about twenty inches square, to place the two cheeks one opposite to the other on each side of the basin, which should incline an inch and a half towards the basin; these must be squared and planed on three sides, from the top of the stillings, but the top should remain rough. In these sides, which are towards the basin, they make a notch at the height of two feet and a half from the basin, three inches broad, four inches deep, and two feet high in ascending towards the head.

They place the false stillings upon the middle wall; and upon each of the other they place two piles, which embrace the cheeks, and are joined to them by square supporters and dove-tails. In crossing the piles and the false stillings, they put the four stillings in notches as in the other Presses; those of the middle embrace the cheeks, and are joined to them as the piles are, and should extend beyond the piles, which are behind the cheeks eight or nine inches. The top of the stillings ought to be notched an inch and a half, fit to receive the piles to keep the whole together; then they put upon these the pieces of maye, which they close, as hath been already said, and the basin is the same with the other Presses.

The spindle of the screw ought to be seven or eight inches longer than the back of the cheeks, and embrace them in their thickest parts; this is placed upon

them, and supported upon the keys, which cross the cheeks, by nails, and must be stayed behind the cheeks with a key; also in front with four iron bars, making a square of a foot and a half, bored at the four corners with pins and nails four or five inches long towards the screw-tap. Upon the spindle they lay planks of the same length, which they cross in such a manner, that their ends are turned towards the front of the Press; upon these planks they lay two cross pieces of the same length as the spindle, which embrace the top of the cheeks under their heads; they let them in at each end in front, where they are joined. These cross pieces and the cheeks ought to be nailed together, and they must put four cross timbers, which should take hold of the head of the beams, and reach half the length of the head pieces, for a support to each.

They afterwards make a screw with the same instrument as that of the other Press, with a square at bottom, to join it to a wheel, which should be laid horizontally well consolidated with the screw, and joined with ribs and spokes a foot wide crosswise; these spokes ought to project out of the ribs three or four inches of half their width, to be able to contain the rope, which must be round the wheel. Under the centre of the wheel they place a standard of the length of the space between the cheeks, and eight inches thick or more, to make a sort of tenon at each end, which goes into the notch of the cheeks. The standard should be sustained by an iron pin, which goes in at the end of the screw, to be held suspended by it, in such a manner that it may waggle. In order to this, the end of the pin which is under the standard, should play with the key which holds it at the other end of the screw.

At ten or twelve feet from the Press they place a wheel, either horizontally or perpendicularly, with an axle-tree, which ought to play in the fliers of wood, well fixed; they bind to the wheel, which is at the top of the basin, to one of the spokes, or one of the pins which is driven in for this purpose, the eilet hole of a great rope two inches and a half diameter. They can turn the wheel once or twice round with the hand, before they take hold of the rope, which ought

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ought to go round the wheel five or six times, and be fastened at the other end to that which is at the side of the Press. They employ seven or eight men to turn this wheel. It is of great consequence to observe, that when there is no more than one turn and a half of the rope above the wheel, and if there is another bag to press, they should remit two or three turns of the rope to the wheel to finish the pressing, otherwise they would risque the breaking of the wheel at the bottom, and laming the pressers. When the bag is sufficiently pressed, they stop the perpendicular wheel for half an hour, to allow time for the wine to drain off. In this sort of Press, there is nothing but the standard Presses, which is borne by the nave, and supplies the place of the great beams which are in the other Presses. There ought to be one experienced man, to whom the others ought to be obedient, to conduct the pressing, and to cut and chop the marc as often as it shall need.

The particular pieces of a slight Press.

The two cheeks, sixteen feet long, and about eighteen or twenty inches thick.

The spindle, fifteen or sixteen feet long, and about three wide.

The head-piece, sixteen feet long, and about thirteen or fourteen inches thick.

The cross timbers, six feet long, and about six or seven inches thick.

The piles, twelve feet long, and about twelve or thirteen inches thick.

The screw, seven or eight feet long, about thirteen inches thick to the spiral line, and sixteen inches at the bottom, fitted to a square; this should be notched in that place two inches, for placing the wheel.

The standard twelve feet and a half long, seventeen or eighteen inches broad in the middle, and ten at the ends, and eight or ten inches thick in the middle, reduced to six or seven at the ends.

The middle wheel, nine feet diameter, and ten or eleven inches thick.

The perpendicular wheel of an equal diameter, and five or six inches thick in every part of the timber.

The axle-tree ten or eleven feet long, and eight inches diameter.

The false stillings, and the pieces of maye, ought to be the same as in the other Presses in every part.

The stillings, eighteen feet long, and the same breadth and thickness, as in the other Presses.

The nave, as in the other Presses, that is to say, seven or eight feet long, and five or six inches square.

This description of the different sorts of Presses which are used in Champagne, together with the annexed plates, will, it is hoped, be sufficient to instruct a workman how to erect either of the sorts here exhibited.

WINTER. [Prognostics of a hard Winter.] The Lord Bacon gives these as signs or forerunners of a hard winter:

If stone or wainscot, that has been used to sweat (as it is called), be more dry in the beginning of winter, or the drops of eaves of houses come down more slowly than they used to do, it portends a hard and frosty Winter. The reason is, that it shews an inclination in the air to dry weather, which, in the Winter time, is always joined with frost.

Generally a moist and cool summer betokens a hard Winter likely to ensue. The reason is, that the vapours of the earth, not being dissipated by the sun in the summer, do rebound upon the Winter.

A hot and dry summer, especially if the heat and drought extend far in September, betokens an open beginning of Winter, and cold to succeed towards the latter part of the Winter, and in the beginning of the spring; for all that time the former heat and drought bear the sway, and the vapours are not sufficiently multiplied.

An open and warm Winter portends a hot and dry summer; for the vapours disperse into the Winter

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showers; whereas cold and frost keep them in, and transport them into the late spring and summer following.

The country people have made this observation, that those years in which there are store of Haws and Heps, commonly portend cold Winters; the natural cause of this may be the want of heat, and abundance of moisture, in the summer preceding, which puts forth those fruits, and must of necessity leave a great quantity of cold vapours undissipated, which causes the cold of the following Winter.

When birds lay up Haws and Sloes, and other stores, in old nests, and hollow trees, it is a sign of a hard Winter approaching.

If fowls or birds, which used at certain seasons to change countries, come earlier than the usual time, they shew the temperature of the weather, according to that country from whence they came; as the Winter birds, fieldfares, snipes, woodcocks, &c.

If they come earlier, and out of the northern countries, they intimate cold Winters likely to ensue with us. And if it be in the same country, they shew a temperature of season, like that of the season in which they come, as bats, cuckoos, nightingales, and swallows, which come towards summer, if they come early, it is a sign of a hot summer to follow. Cold dews, and morning rains, about Bartholomew-tide, and hoar frosts in the morning about Michaelmas, foretel a hard Winter.

When sea pyes flock from salt to fresh water, it signifies a sudden alteration of weather to much cold.

WINTERANIA. Lin. Sp. Plant. 636. Winter's Bark.

The CHARACTERS are,

The empalement of the flower is bell-shaped, composed of three roundish concave lobes; the flower has five oblong sessile petals, which are longer than the empalement, and a conical cup-shaped nectarium, which is concave and the length of the petals: it hath no stamina, but linear, parallel, distinct summits, sitting on the outside of the nectarium, with an oval germen within the nectarium, supporting a cylindrical style, crowned by three obtuse stigmas; the germen afterward becomes a round berry, having three cells, containing two heart-shaped seeds.

This genus is ranged in the first section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina or summits and one style.

We have but one SPECIES of this genus, viz.

WINTERANIA (*Canella*.) Lin. Sp. Plant. 636. *Cassia Cinnamomea*, sc. *Cinnamomum sylvestre*, *Barbadiendum*. Pluk. Alm. 89. tab. 169. f. 7. *Wild Cinnamon*, or *Cassia of Barbadoes*.

This tree grows naturally in most of the English islands in the West Indies, where it rises to the height of about twenty feet; the stem is generally furnished with branches from the ground to the top, covered with a light Ash-coloured bark, and garnished pretty closely with oblong leaves about two inches and a half long, which are narrow at their footstalks, but at their extremity, where they are enlarged and rounded, they are a full inch broad, of a light or pale green colour, standing upon short footstalks; they are placed without order toward the end of the branches, where the flowers come out almost in form of an umbel, which are composed of five oblong petals of a scarlet colour; these are succeeded by roundish berries, having an umbilical calyx at their top, inclosing shining black seeds.

The whole plant, bark, leaves and fruit, are very aromatic, and has much the taste of spiced gingerbread.

The bark is much used by the inhabitants as a spice to relish their viands, and also in medicine to discharge phlegm; though it is much doubted whether it is the same with the bark which was brought by Captain Winter, from the Streights of Magellan.

As this tree is a native of hot climates, so it is too tender to live in England out of a stove. I raised several of these plants from seeds, which were sent me from Antigua a few years past, some of which are grown four

four or five feet high ; and one old plant which came from Barbadoes several years since, is more than twelve feet high, but has not yet produced any flowers. These plants require to be plunged into a tan-bed in the stove, and in winter should be sparingly watered, but in summer they should have it in greater plenty ; when also they should have a good share of air admitted to them when the weather is warm. With this management the plants may be preserved very well, but they are difficult to propagate ; for I have laid down many of their under branches into the earth, but not one in twelve has put out roots : I have also planted cuttings with as little success ; so that the surest method is to procure fresh seeds from America.

WOODS and groves are the greatest ornaments to a country seat, therefore every seat is greatly defective without them ; Wood and water being absolutely necessary to render a place agreeable and pleasant. Where there are Woods already grown to a large size, so situated as to be taken into the garden or park, or so nearly adjoining, as that an easy communication may be made from the garden to the wood ; they may be so contrived by cutting of winding walks through them, as to render them the most delightful and pleasant parts of a seat (especially in the heat of summer), when those walks afford a goodly shade from the scorching heat of the sun.

As I have already treated of the use and beauty of wildernesses, and have given directions for the making and planting of them, I shall not enlarge much upon that head in this place ; therefore I shall only give some short instructions, for the cutting and making of these Wood-walks in those places where persons are so happy as to have any grown Woods, so situated as to be near the habitation, and are either taken into the garden, or walks made from the house or garden, leading to them ; as also how to plant and decorate the sides of these walks with shrubs and flowers, so as to render them agreeable and pleasant ; and then I shall more fully treat of the method to raise and improve Woods, so as to be of the greatest advantage to the possessor, and a public benefit to the nation.

Where persons have the convenience of grown Woods near their habitation, so as that there may be an easy communication from one to the other, there will be little occasion for wildernesses in the garden ; since the natural Woods may be so contrived as to render them much pleasanter than any new plantation can possibly arrive to within the compass of twenty years, where the trees make the greatest progress in their growth ; and in such places where their growth is slow, there cannot be expected shade equal to the grown Woods, in double that number of years ; but there is not only the pleasure of enjoying a present shade from these Woods, but also a great expence saved in the planting of Wildernesses ; which, if they are large, and the trees to be purchased, will amount to no small sum. If the Wood is so situated, as that the garden may be contrived between the house and that, then the walk into the Wood should be made as near to the house as possible, that there may not be too much open space to walk through in order to get into the shade ; if the Wood is of small extent, then there will be a necessity for twisting the walks pretty much, so as to make as much walking as the compass of ground will admit ; but there should be care taken not to bring the turns so near each other, as that the two walks may be exposed to each other, for want of a sufficient thickness of Wood between ; but where the Wood is large, the twists of the walks should not approach nearer to each other than fifty or sixty feet ; or in very large Woods, they should be at a greater distance ; because, when the under Wood is cut down, which will be absolutely necessary every tenth or twelfth year, according to its growth, then the walks will be quite open, until the under Wood grows up again, unless a border of shrubs, intermixed with some evergreens, is planted by the sides of the Walks, which is what I would recommend, as this will greatly add to the pleasure of these walks.

These Wood-walks should not be less than eight or nine feet broad in small Woods ; but in large ones fifteen feet will not be too much, and on each side of the Walks. The border of shrubs and evergreens may be nine or ten feet broad ; which may be so managed, as to shut out the view from one part of the walk to the other, at those times when the under Wood is cut down, at which times there will be an absolute occasion for such plantations ; and at all times they will afford great pleasure, by adding to the variety, as also by their fragrant odour. The particular sorts of shrubs which will thrive in the shade of Woods, as also the flowers proper to plant near these walks, are mentioned in separate lists, at the end of this work, so I shall not insert them in this place.

The former method which was practised in cutting of these walks through Woods, was to have them as strait as possible, so that there was much trouble to make fights through the Woods, for direction how to cut them ; but where this was practised, every tree which stood in the line, good and bad, were cut down, and many times boggy or bad ground was taken into the walks ; so that an expence of draining and levelling, was necessary to render them proper for walking on ; besides this, there were many other inconveniencies attending these strait cuts through Woods, as, first, by letting in a great draught of air, which in windy weather renders the walks unpleasant ; and these cuts will also appear at a great distance from the Woods, which will have a very bad effect ; therefore the modern practice of twisting the walks through Woods, is to be preferred. In the cutting of these walks, there should be particular care taken to lead them over the smoothest and soundest part of the ground, as also to avoid cutting down the good trees ; so that whenever these stand in the way, it will be better to lead the walk on one side, than to have the tree stand in the middle ; for although some persons may contend for the beauty of such trees which are left standing in walks, yet it must be allowed, that unless the walk is made much broader in those places than in the other, the trees will occasion obstructions to the walkers, especially when two or three persons are walking together, so that it will be much better to have the walks entirely clear from trees ; and where any large-spreading trees stand near the walk, to cut away the small Wood, so as to make an opening round the trees, where there may be some seats placed, for persons to rest under the shade. The turns made in these walks should be as easy and natural as possible ; nor should there be too many of them, for that will render the walking through them disagreeable ; therefore the great skill in making of these walks is, to make the turns so easy as not to appear like a work of art, nor to extend them strait to so great length, as that persons who may be walking at a great distance, may be exposed to the sight of each other ; both these extremes should be avoided as much as possible, since they are equally disagreeable to persons of true taste. When a Wood is properly managed in this way, and a few places properly left like an open grove, where there are some large trees so situated as to form them, there can be no greater ornament to a fine seat than such a Wood.

We shall now treat of the culture of Woods for profit to the possessor, and for the public benefit of the nation. The great destruction of the Woods and forests which has been of late years made in this country, should alarm every person who wishes well to it ; since there is nothing which seems more fatally to threaten a weakening, if not a dissolution, of the strength of this once famous and flourishing nation, than the notorious decay of its timber ; and as this devastation has spread through every part of the country, so unless some expedient be seriously and speedily resolved on, to put a stop to this destruction of the timber, and also for the future increase of it, one of the most glorious bulwarks of this nation will, in a few years, be wanting to it.

And

And as there are small hopes of this being remedied by those intrusted with the care of the public Woods, since their private interest is so much better advanced by the destroying the timber, which they were appointed to preserve: therefore, unless private persons can be prevailed on to improve their estates, by encouraging the growth of timber, it is greatly to be feared, that in an age there will be a want of it for the supply of the navy; which, whenever it happens, must put a period to the trade of this country.

It has been often urged, by persons whose judgment in other affairs might be depended on, that the great plantations, which, for several years past, have been carried on in several parts of this kingdom, will be of public benefit, by the propagation of timber; but in this they are greatly mistaken; for in most of the plantations which have been made for years past, there has been little regard had to the propagation of timber; present shade and shelter have been principally considered; and in order to obtain these soon, great numbers of trees have been taken out of Woods, hedge rows, &c. which, if they had remained in their first situation, might in time have afforded good timber; but by being transplanted large, are absolutely rendered unfit for any use but fuel; so that the great quantity of plantations which have been made, I fear, will rather prejudice than be of use, to the improvement of timber; nor is there any other method of increasing the useful timber of this country, than by sowing the seeds in the places where they are to remain; or in such situations, where there are plenty of Oaks in the neighbourhood, if the ground is properly fenced, to keep out cattle and vermin, the Acorns which drop from those trees will soon produce plenty of young trees; which, if properly taken care of, will soon grow to Woods.

The two most substantial timbers of this country are the Oak and Chestnut, though the latter has been of late years almost entirely destroyed in England, so that there are scarce any remains of trees of size in the Woods at present; but there can be no doubt of this tree having been one of the most common trees of this country, as may be proved by the old buildings in most parts of England, in which the greatest part of the timber is Chestnut. But as I have already treated largely of the method of propagating both these trees for profit, under their respective titles, I shall not repeat it here. Next to these, the Elm is esteemed as a profitable timber; but of these there are few cultivated in Woods, especially in the south part of England, where they chiefly grow in hedge rows, or plantations near houses; but in the north-west part of England, there are numbers of very large trees of the Witch-Elm growing in parks, and some in Woods, as if that tree was a native of this country, which has been much doubted; though as this tree propagates itself by seeds, it may be deemed an indigenous plant in England.

The Beech is another tree common in the Woods, especially upon the chalky hills of Buckinghamshire, Kent, Sussex, and Hampshire, where there are some very large Woods, entirely of this sort; some of which have been of long standing, as appears by the age of the trees; but whether this tree is a native of this country, has been a point often disputed.

The Ash is a very profitable tree, and of quick growth; so that in less than an age, the trees will arrive to a large size from the seeds; therefore a person may hope to reap the profits of his labour, who sows the seeds; but this is not a beautiful tree to stand near a habitation, being late in the spring in putting out its leaves, and the first that sheds them in autumn; nor is a friendly tree to whatever grows near it, the roots drawing away all the nourishment of the ground, whereby the trees or plants which grow near are deprived of it; so that where the Ash-tree grows in hedge rows, the hedge rows in a few years are entirely destroyed; and if they are in pasture grounds, and the cows browse on them, the butter made with their milk will be bad; for which reason the Ash should be

sown separate in lands which are inclosed, where cattle are not permitted to come, and at a distance from the habitation.

Upon sandy or rocky soils, the Scotch Pine will thrive exceedingly, and turn to great advantage to the planter, provided the plants are planted young, and treated in the manner directed in the article PINUS, to which the reader is desired to turn, to avoid repetition. There are also several aquatic trees, which are very profitable to those who have low marshy lands, where the harder kinds of timber will not thrive; these are the Poplars of several sorts, the Willow, Alder, &c. but as these, and all the other kinds of trees, have been fully treated of, both as to their propagation and uses, and also an account of the different soils in which each will thrive best, under their respective titles, the reader is referred to them for farther information; and I shall next treat of the general management of Woods, of whatever kinds of trees they are composed.

Where there are young Woods, great care must be taken of the fences; for if cattle should get in among the trees, especially while they are young, they will in a short time do infinite damage to them, by browsing on the branches, or barking the trees; so that during the first twenty years of their growth, they should be secured from hares and rabbits, otherwise in severe frost, or when the ground is covered with snow, whereby they are deprived of other food, they get into the Woods, and eat off the bark from the young trees, and gnaw all the branches within their reach; so that in a few days, where there are plenty of these animals, there may be such destruction made among the young trees, as cannot be retrieved, but by cutting them down to the ground, which will be a loss of several years; therefore those persons who have the care of young Woods, should be very diligent in frosty weather, in looking over the trees, and stopping the holes in the fences, to keep out all vermin.

Another care to be taken of young Woods, is the thinning the trees from time to time, as they increase in their growth; but in doing of this, there must be great caution used; for it should be gradually performed, so as not to open the trees too much, to let the cold air among them, which will greatly retard their growth; nor should the trees be left so close, as to draw each other up like May-poles, but rather observe a medium in this work, cutting down a few each year, according as there may be necessity for it, being careful not to permit those to stand, which may spoil the growth of the neighbouring trees, always observing to leave those trees which are the most promising.

The young trees in these Woods should not be lopped or pruned, for the more they are cut, the less they will increase in bulk; every branch which is cut off, will rob the tree of its nourishment, in proportion to the size of the branch; therefore the hatchet should not be suffered to come into young Woods, unless in the hands of skilful persons.

Where persons have more regard to the future welfare of the timber than their immediate profit, the under Wood should be grubbed up as the trees advance, that the roots may have the whole benefit of the soil, and their stems enjoy the free air; without which, their stems are generally covered with Moss, and their growth greatly stunted; as may be observed in all such Woods, where there is any quantity of under Wood remaining; in which places it is rarely found, that the trees do ever grow to a large size; therefore where large timber is desired, the trees must have room to extend their roots and branches, without which it cannot be expected; but from a covetous temper, many people let their under Wood remain as long as it will live; for as the timber increases, the under Wood will be gradually decaying, by the shade and drip of the large trees; so that by this method the timber suffers more in a few years, than the value of the under Wood; therefore, by endeavouring to have both, neither of them can be so good, as where they are separately preserved.

W O O

If persons who have estates would be careful to nurse up trees in their hedge rows, it would in time become a fortune to their successors, as hereby the timber growing in the hedges may be worth more than the freehold of the estate, which has often been the case with estates, from which their possessors have cut down timber for fortunes for their younger children; the frequency of this should encourage persons to be a little more attentive to the growth and preservation of young Woods, since the expence and trouble is not great, and the future profit very certain; besides, the pleasure of seeing trees of a man's own sowing make yearly advances, must be very great to those who have any relish for country amusements.

There are several persons who plant copses for cutting every ten or twelve years, according to their growth. These are usually planted in autumn, either with stools or young plants, which are drawn out of the Woods; the latter should always be preferred to the former. These copses are commonly planted with several sorts of trees, as Oak, Beech, Chestnut, Ash, Birch, Willow, &c. but the Ash and Chestnut are the most profitable, where they grow kindly, because the poles of Ash are very valuable; these also are good for hoops, so that there is no danger of having sale for these copse Woods when they are fit for cutting; but where the copses are intended to remain, there should be no standard-trees left for timber; because as the heads of the trees spread, and overtop the under Wood, it will cause that to decay; and where the standards are left upon the stumps of the copse Wood, they will never grow to a large size, nor will the timber be so valuable as that produced immediately from a young root; therefore whoever will make the experiment, will be convinced, that it is more for the advantage of both, to keep them in distinct Woods.

W O O

But where persons plant copses upon land free from trees, it will be the better method to sow the seeds, especially if Chestnut, Oak or Beech, are the trees intended; for although it is a prevailing opinion with the generality of persons, that by planting they save time, yet I am sure of the contrary; for if the seedling plants are kept clear from weeds, they will in eight or ten years out-grow those which are planted, and these unmoved copses will continue much longer in vigour than the other; so that for either timber or copse Wood, the best method is to prepare the ground well, and secure the fences, and sow the seeds, which is so far from losing, that in twenty years it will be found to gain time, which is what every planter wishes to do.

The usual time of felling timber is from November to February, at which time the sap in the trees is hardened; for when the sap is flowing in the trees, if they are cut down, the worm will take the timber, and cause it to decay very soon; therefore if the durability of the timber is considered, the trees should always be cut in the winter months; but as the bark of the Oak is so valuable for tanning leather, there has been a law passed, to oblige persons to cut these trees during the spring season, when the bark will readily peel off; by which the timber is rendered unfit for building either ships or houses, as it will be very subject to cast, rift, or twine, and the worm will soon take it; therefore it would be more for the public benefit, if a law were enacted, to oblige every person to strip off the bark of such trees as are designed to be cut down in the spring, leaving the trees with their branches standing till the following winter, which will be found to answer both purposes well.

X.

X A N

XANTHIUM. Tourn. Inst. R. H. 438. tab. 252. Lin. Gen. Plant. 937. Lesser Burdock. The CHARACTERS are,

It hath male and female flowers on the same plant. The male flowers have a common scaly empalement; they are composed of several tubulous funnel-shaped florets, which are equal, and disposed in a hemisphere; they are cut into five segments at the top, and have each five very small stamina, terminated by erect parallel summits. The female flowers are situated under the male by pairs; they have no petals or stamina, but they are succeeded by oblong, oval, prickly fruit, having two cells, each including one oblong seed, convex on one side, and plain on the other.

This genus is ranged in Dr. Linnæus's first section of his twenty-first class, which contains the plants which have separate male and female flowers, and the male flowers have five stamina.

The SPECIES are,

1. XANTHIUM (*Strumarium*) caule inermi, foliis cordatis trinervatis. Hort. Cliff. *Xanthium with an unarmed stalk, and heart-shaped leaves having three veins.* Xanthium five Lappa minor. J. B. 3. 572. Lesser Burdock.
2. XANTHIUM (*Canadense*) caule inermi, foliis cuneiformi-ovatis subtrilobis. Lin. Sp. 1400. *Canada Xan-*

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thium with an unarmed stalk, and oval wedge-shaped leaves, having almost three lobes. Xanthium majus Canadense. H. L. 635. *Greatest Canada Burdock.*

3. XANTHIUM (*Spinosum*) spinis ternatis. Hort. Upsal. 283. *Portugal Xanthium with triple thorns.* Xanthium Lusitanicum spinosum. Pluk. Alm. 206. *Portugal Prickly Burdock.*

4. XANTHIUM (*Chinense*) caule inermi ramosa, aculeis fructibus erectis longissimis. *China Xanthium with an unarmed branching stalk, and the spines of the fruit very long and upright.*

The first sort grows naturally in Europe, and also in India, from whence I have received the seeds; it has been found growing wild in a few places in England, but of late years it has not been seen in those places. I did once see it growing in the road near Dulwich College. The stalk of this plant is round, and has many black spots; it rises in good ground two feet high, sending out a few side branches. The leaves stand upon slender foot-stalks, which are near four inches long. From the wings of the stalk arise the foot-stalks of the flowers. The leaves are almost heart-shaped, but some of the larger are cut on their sides into three acute lobes; they are irregularly indented

dented on their edges, ending in acute points, and are of a pale green on their under side, but of a dark green on their upper. The flowers are produced in loose spikes, the male flowers growing at the top, and the female flowers under them, which are of an herbaceous colour, and are collected in roundish heads. The female flowers are succeeded by oblong oval fruit, closely armed with short erect spines. This plant flowers in July, and the seeds ripen in autumn.

This plant has been much esteemed by some physicians, for the cure of scrophulous tumours, and also in leprosy, but is rarely now used.

The second sort grows naturally in North America. The stalks of this are much thicker, and rise higher than those of the first; the leaves are not hollowed at their base, nor are they divided so deeply on their sides, as those of the first; they are unequally indented on their edges, and have three strong longitudinal veins, but are of the same colour with the former. The flowers are produced in shorter and looser spikes. The fruit are much larger, and are armed with stronger spines which are incurved. This flowers in August, and in warm seasons the fruit will ripen in autumn.

The third sort grows naturally in Portugal and Spain. The stalks of this rise three feet high, and send out many branches the whole length; these are garnished with oblong leaves which are indented on their edges, and end in acute points; they are from two to three inches long, and three quarters of an inch broad, of a dark green on their upper side, but hoary on their under, having very short foot-stalks. The flowers come out from the side of the branches, two or three at each place, one of which is female, and is succeeded by oblong oval fruit, armed with slender sharp spines which are erect. The stalks and branches are armed with long, stiff, triple thorns on every side, which renders it dangerous to handle them. This flowers in July and August, and in warm seasons the seeds ripen in autumn.

The fourth sort grows naturally in China, from whence I have often received the seeds; the plants are like those of the first sort, but grow larger, and branch more; the flowers are produced in loose spikes at the top of the stalks; the fruit is like that, but the spines are slender, single, and strait. This flowers about the same time with the third sort, but, unless the autumn proves warm, the seeds will not ripen in England.

All these plants are annual. The first will come up from the seeds which fall in autumn, and requires no other care but to thin the plants where they are too close, and keep them clear from weeds; the second sort formerly was as easily cultivated, and came up from the self-sown seeds as readily, and rarely failed to ripen its seeds; but of late years the autumns have proved so bad, as that the seeds have not come to maturity.

The third sort will perfect its seeds some years on self-sown plants, but, as they sometimes fail, the sure way is to raise the plants on a gentle hot-bed, and after they have obtained strength, plant them on a warm border on a lean soil, which will stint the plants in their growth, and cause them to be more fruitful; for when they are planted in rich ground, the plants will grow to a large size, and will not produce flowers till late in autumn, so the seeds will not ripen.

The fourth sort must be raised on a hot-bed in the spring, and the plants should be transplanted each into a small pot, and plunged into a fresh hot-bed to bring them forward. After they have obtained strength, they should be inured to the free air gradually, and in June some of the plants may be turned out of the pots, preserving the ball of earth to their roots, and planted in a south border, where, if the season proves favourable, they will perfect their seeds.

All these plants delight to grow in a rich moist soil.

XANTHOXYLUM. Lin. Gen. Plant. 335. The Tooth-ache-tree.

The CHARACTERS are,

It hath male and female flowers on different plants. The male flower has no empalement, but has five oval petals, and five slender stamina which are longer than the petals, terminated by furrowed summits; it has three germen, which are united at their base, having each a lateral style crowned by obtuse stigmas. The germen afterward become so many capsules, each containing one roundish, hard, shining seed.

This genus of plants is ranged in the fifth section of Linnaeus's twenty-second class, which includes those plants which have male and female flowers on different plants, whose flowers have five stamina and as many styles.

The SPECIES are,

1. XANTHOXYLUM (*Clava Herculis*) foliis pinnatis. Lin. Sp. Plant. 1455. *Tooth-ache-tree with winged leaves.* Xanthoxylon spinosum, lentisci longioribus foliis, eonymi fructu capsulari. Catesb. Carolin. 1. p. 26. *Prickly Tooth-ache-tree with longer Maslich-tree leaves, and capsules to the fruit like that of the Spindle-tree.*
2. XANTHOXYLUM (*Americanum*) foliis pinnatis, foliolis oblongo ovatis integerrimis sessilibus. *Tooth-ache-tree with winged leaves, having oblong, oval, entire lobes without foot-stalks, commonly called broad-leaved Tooth-ache-tree.*

The first sort grows naturally in South Carolina, where it rises to the height of fifteen or sixteen feet. The stem is woody, and about a foot thick, covered with a whitish rough bark, and armed with short thick spines; these grow to a large size as the trunk increases in bulk, so as to become protuberances terminating in spines. The leaves are sometimes placed by pairs, and at others they stand without order; they are composed of three, four, or five pair of spear-shaped lobes placed opposite, terminated by an odd one; they are of a deep green on their upper side, and of a yellowish green below, a little sawed on their edges, and stand upon short foot-stalks. At the end of the branches come forth the foot-stalks which sustain the flowers; these branch out, and form a loose panicle. The flowers are composed of five white petals which are small, having no cover; they are by some called the empalement, but being of a different colour from the leaves, I shall take the liberty to stile them petals. Within these are situated five stamina which are terminated by reddish summits, and in the female flowers there are five styles fastened to the side of the germen. After the flower is past, the germen turns to a roundish four-cornered capsule, each containing one roundish, hard, shining seed. It is sometimes called Pellitory-tree.

This has been generally confounded with the prickly yellow Wood, or yellow Hercules of Sir Hans Sloane, but is very different from that; for in the West-Indies it is one of their largest timber trees, and the specimens which I have received from Jamaica, are very different from those of Carolina. The leaves of the former are twice as large as those of the latter; the lobes of the leaves are almost three inches long, and an inch and a half broad; they sit close to the foot-stalk, and the leaves are equally winged, having no single lobe at the end. The flowers of this I have not seen, but the capsules have five cells, each containing one black, shining, hard seed.

The second sort grows naturally in Pennsylvania and Maryland; this hath a woody stem, which rises ten or twelve feet high, sending out many branches toward the top; these have a purplish bark, and are armed with short thick spines standing by pairs. The leaves are unequally winged, and are composed of four or five pair of oblong oval lobes, terminated by an odd one; these stand close to the midrib, having no foot-stalks. The midrib is armed on the under side with some small spines. The upper side of the leaves are of a deep green, their under side is of a pale green; they have a warm biting taste. The bark of the tree is used for curing the tooth-ache, from whence it has the name. The flowers grow in loose panicles like those of the former sort, and these are succeeded by fruit with five cells, each including one hard shining seed.

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These plants are generally propagated by seeds, but as they never ripen in this country, they must be procured from those places where they naturally grow, or the plants must be propagated by layers. When the seeds arrive in England, they should be sown in pots filled with light earth as soon as possible, for they do not grow the first year; and when they are kept out of the ground till spring, they frequently lie two years in the ground before the plants appear; therefore the pots should be plunged into the ground up to their rims, in an east-aspected border, where they may remain during the summer; this will prevent the earth in the pots from drying too fast, which it is very apt to do when the pots are set upon the ground in the sun. The only care to be taken of the seeds is, to keep the pots constantly clean from weeds, and in very dry weather refresh them now and then with water. In autumn the pots should be placed under a common hot-bed frame, where they may be screened from frost, or else plunged into the ground in a warm border, and covered with tan to keep out the frost, and the following spring they should be plunged into a hot-bed, which will bring up the plants. When these appear, they must be frequently, but sparingly watered, and kept clean from weeds; and, as the summer advances, those of the second sort should be gradually inured to bear the open air, into which they should be removed in June, placing them in a sheltered situation, where they may remain till autumn, when they must be placed in a hot-bed frame to shelter them in winter. The spring following, before the plants begin to shoot, they should be carefully taken up, and each planted into a separate small pot; these may be plunged into a gentle hot-bed, which will forward them greatly in putting out new roots. The after care must be to shelter them for a year or two in winter, until the plants have gotten strength; then in the spring, after the danger of frost is over, some of them may be turned out of the pots, and planted in the full ground in a warm sheltered situation, where the second sort will thrive very well, and resist the cold; but the first is not so hardy, so these may be planted against a south wall, where they will thrive very well. Some of the plants of this sort had been planted in the open air, in the Chelsea Garden, some years past, where they had thriven and endured the cold without any covering, but the severe winter in 1740 destroyed them all. These plants may be increased by cutting off some of their strong roots, preserving their fibres to them, and these planted in pots filled with light earth, plunging them into a moderate hot-bed, will cause them to push out roots and become plants; but these will not thrive so well, nor grow near so large as those which are raised from seeds.

XERANTHEMUM. Tourn. Inst. R. H. 499. tab. 284. Lin. Gen. Plant. 851. [from *ἔτος* dry, and *ἄθος* a flower, q. d. dry flower. Clusius calls this plant *Parmica Austriaca*, but that name being applied to another genus, this title of *Xeranthemum* is now generally received. It is vulgarly called *Immortal*, because the flower of it may be kept for many years; for it has rigid petals, which crackle as if they were plates of metal.] *Eternal Flower*, or *Parmica*, vulgò.

The CHARACTERS are,

The flower is composed of hermaphrodite and female florets, which have one common scaly empalement. The hermaphrodite florets which form the disk, are funnel-shaped, spreading, and cut into five points; the female florets, which compose the border or rays, are tubulous, and cut into five less equal points; the hermaphrodite florets have five short stamina terminated by cylindrical summits, and a short germen, supporting a slender style, crowned by a bifid stigma. The germen afterward becomes an oblong seed crowned with hairs, which ripens in the empalement. The female florets have no stamina, but their germen, styles, and seeds, are the same as the hermaphrodite.

This genus of plants is ranged in the second section of Linnæus's nineteenth class, which contains those plants whose flowers are composed of female and hermaphrodite florets which are both fruitful.

X E R

The SPECIES are,

1. **XERANTHEMUM** (*Annuum*) herbaceum foliis lanceolatis patentibus, caule herbaceo. Lin. Sp. Plant. 1201. *Eternal Flower with spreading spear-shaped leaves. Xeranthemum flore simplici purpureo majore. H. L. Eternal Flower, with a larger, purple, single flower, commonly called Parmica.*
2. **XERANTHEMUM** (*Inapertum*) foliis lineari-lanceolatis utrinque tomentosis. *Eternal Flower with linear spear-shaped leaves, which are downy on both sides. Xeranthemum flore simplici purpureo minore. Tourn. Inst. R. H. 499. Eternal Flower with a smaller, single, purple flower.*
3. **XERANTHEMUM** † (*Orientale*) foliis lineari-lanceolatis, capitulis cylindraceis, semine maximo. *Eternal Flower with linear spear-shaped leaves, cylindrical beads, and a very large seed. Xeranthemum flore purpureo simplici minimo, semine maximo. H. L. Eternal Flower, with the smallest, single, purple flower, and the largest seed.*
4. **XERANTHEMUM** (*Speciosissimum*) fruticosum erectum, foliis amplexicaulibus trinerviis, ramis unifloris subnudis. Lin. Sp. Plant. 1202. *Shrubby, erect, Eternal Flower, with spear-shaped leaves, and almost naked branches bearing one flower. Xeranthemum tomentosum latifolium, flore maximo. Burman. Pl. Afr. 178. tab. 66. fig. 2. Broad-leaved, woolly, Eternal Flower, with the largest flower.*
5. **XERANTHEMUM** (*Retortum*) caulibus frutescentibus provolutis, foliis tomentosis recurvatis. Lin. Sp. 858. *Eternal Flower with shrubby trailing stalks, and downy recurved leaves. Xeranthemoides procumbens, polii folio. Hort. Elth. 423. Trailing Bastard Eternal Flower, with a Mountain Poley leaf.*
6. **XERANTHEMUM** (*Sesamoides*) ramis unifloris imbricatis, foliis linearibus adpressis. Lin. Sp. Plant. 1203. *Eternal Flower with imbricated branches with one flower, and linear pressed leaves. Xeranthemum ramosum, foliolis squamosis linearibus, floribus argenteis. Burm. Afr. 181. tab. 67. f. 2. Branching Eternal Flower, with squamose leaves and silvery flowers.*

The first sort grows naturally in Austria, and some parts of Italy, but has been long cultivated in the English gardens for ornament. Of this there are the following varieties; one with a large, single, white flower, the purple and white with double flowers, though these only differ in the colour and multiplicity of petals in their flowers, so are not mentioned as distinct species, yet where their seeds are carefully saved separate, they are generally constant.

These plants are annual; they have a slender branching stalk, which is covered with a white down that is angular and furrowed; it rises about two feet high, and is garnished with spear-shaped leaves an inch and a half long, and a quarter of an inch broad, which are hoary, sitting close to the stalk, but spread out from it. The stalk divides into four or five branches; these are garnished with a few leaves at their lower parts, of the same shape with the other, but are less. The upper part of the branches is naked, and sustains one flower at the top, composed of several female and hermaphrodite florets, included in one common scaly empalement of a silvery colour. The florets are succeeded by oblong seeds crowned with hairs. The petals of these flowers are dry, so if they are gathered perfectly dry, and kept from the air, they will retain their beauty a long time; they flower in July, August, and September, and the seeds ripen in autumn.

The second sort grows naturally in Italy. The stalks of this do not rise much more than a foot high, and do not branch so much as the former. The leaves are narrower, and the whole plant very hoary. The flowers are not half so large as those of the former, and the scales of their empalements are very neat and silvery. This flowers at the same time as the former.

The third sort grows naturally in the Levant; this rises about the same height as the first sort. The leaves are narrower, and are placed closer on the stalks

stalks to the top. In other respects the plants are very like, but the flowers are much less, of a paler purple colour, and have a cylindrical empalement. The seeds are very large, and seldom more than three or four in each head. This flowers about the same time as the first.

These flowers were formerly much more cultivated in the English gardens than at present, especially the two sorts with double flowers, which the gardeners near London propagated in great plenty for their flowers, which they brought to market in the winter season, to adorn rooms, to supply the place of other flowers, which are not easy to be procured at that season; for these, being gathered when they are fully blown, and carefully dried, will continue fresh and beautiful many months; but as there are no other colours in these flowers but white and purple, the gardeners had a method of dipping them into various tinctures, so as to have some of a fine blue, others scarlet, and some red, which made a pretty variety; and if they were rightly stained, and afterwards hung up till they were thorough dry, they would continue their colours as long as their flowers lasted. The stalks of the flowers were not set in water, but the pots or glasses were half filled with dry sand, into which the stalks were placed, and in those they would continue in beauty the whole winter.

These plants are propagated by seeds, which may be sown either in the spring or autumn on a border of light earth, but the latter season is preferable; for those plants which come up in autumn will flower sooner, the flowers will be doubler and much larger than those which are sown in the spring, and from these good seeds may be always obtained; whereas the spring plants many times fail in cold years, and in hot dry seasons the plants do not grow to any size.

When the plants come up, and are about two inches high, they should be pricked out into another border under a warm wall, pale, or hedge, at about four or five inches distance from each other, or into the borders of the flower-garden. In this place the plants will endure the cold of our ordinary winters extremely well, and in the spring will require no farther care but to keep them clear from weeds, for they may remain in the same place for good. In June they will begin to flower, and the beginning of July they will be fit to gather for drying; but a few of the best and most double flowers of each kind should be suffered to remain for seed, which, in about six weeks or two months time will be ripe, and the plants will perish soon after; so that the seeds must be annually sown, in order to preserve the kinds.

The fourth sort grows naturally at the Cape of Good Hope; this rises with a shrubby stalk three or four feet high, dividing into four or five branches, whose lower parts are garnished with thick-pointed leaves, about two inches long and one broad, which are hoary on their under side, and are ranged without order. The upper part of the branches are naked, and are terminated by one large yellow flower, composed of many oblong acute-pointed rays in the border, and the middle or disk, which is prominent, is made up of hermaphrodite florets, which are of a splendid yellow colour.

The fifth sort also grows naturally at the Cape of Good Hope. The stalks of this sort are very slender, ligneous, and trail upon the ground; they extend three or four feet in length, and are garnished with small silvery leaves placed without order, which sit close to the stalks, and are reflexed. The flowers are produced from the wings of the branches, sometimes one, and at others two or three flowers arise at the same point; these have scaly empalements; their border or rays are composed of many female florets of a white colour, and their middle of hermaphrodite florets, and are succeeded by oblong seeds crowned with hairs. This plant flowers in July and August, but the seeds seldom ripen in England.

The sixth sort is a native of the country near the Cape of Good Hope; this has a shrubby branching stalk,

which rises three or four feet high. The branches are slender, and like those of the Spanish Broom, but are hoary; these have very small leaves resembling scales, which sit close to the branches; they are narrow and hoary, ending in acute points. The stalks are each terminated by one large silvery flower, having a stiff, dry, scaly empalement. The rays of the flower are composed of many dry female florets, and the disk or middle is made up of hermaphrodite florets; these are succeeded by oblong seeds crowned with hairs, which do not ripen in England.

As these last mentioned plants do not ripen their seeds in England, they are propagated by cuttings, which, if planted on a bed of light earth, during any of the summer months, and shaded from the sun, will put out roots. When they have gotten sufficient strength, they should be carefully taken up, and planted into separate pots filled with light earth, and placed in a shady situation till they have taken fresh root; then they may be removed to a sheltered situation, where they may have more sun, and here they may remain till autumn, when they must be removed into shelter, for they are too tender to live abroad through the winter in England, though they do not require any artificial warmth. I have kept these plants in a common hot-bed frame all winter, exposing them always to the open air in mild weather, but covering them in frost, and these plants have been stronger, and have flowered better than those which were placed in the green-house; so that I would recommend this method of treatment as the best, for the plants are apt to draw up weak in a green-house, and that prevents their flowering; nor are the plants near so handsome, as those which are more exposed to the open air.

In the summer time they should be placed abroad in a sheltered situation with other hardy exotic plants, and in dry weather they will require to be often watered, for they are pretty thirsty plants, but in winter it should be sparingly given to them. As these plants are not of long duration, there should be young plants propagated to succeed them, for if they live four or five years, it will be long enough, because after that age they become unsightly.

XIMENIA. Plum. Gen. Nov. 6. tab. 21. Lin. Gen. Plant. 1105.

The title of this genus was given to it by Father Plumier, in honour of the Reverend Franciscus Ximenes, a Spaniard, who published an account of the Mexican trees and plants in four books, in the year 1615.

The CHARACTERS are,

The flower has a small empalement of three leaves, which falls off; it has one bell-shaped petal which is cut into three segments at the top, which turn backward; it has eight short awl-shaped stamina terminated by single summits, and a small oval germen, situated under the flower, supporting a very short style, crowned by a beaded stigma. The germen afterward turns to an oval fleshy berry, including an oval nut with one cell, containing one seed of the same form.

This genus of plants is ranged in the first section of Linnæus's eighth class, the flowers having eight stamina and one style.

The SPECIES are,

1. XIMENIA (*Americana*) foliis oblongis, pedunculis multifloris. Lin. Sp. Plant. 1193. *Ximania with oblong leaves, and foot-stalks bearing many flowers.* Ximania aculeata, flore villosa, fructu luteo. Plum. Gen. Nov. 6. *Prickly Ximania with a hairy flower, and a yellow fruit.*
2. XIMENIA (*Agibolid*) foliis geminis lanceolatis. *Ximania with spear-shaped twin leaves.* Agibolid. Alpin. Egypt. 38.

The first sort grows naturally in the islands of the West-Indies; it rises with a woody stalk twenty feet high, sending out several branches on every side, which are armed with thorns, and garnished with spear-shaped leaves standing round the branches without order. The flowers are produced at the end of the branches;

they have one bell-shaped petal, cut almost to the bottom into three segments which are rolled backward, and are hairy; within they are of a yellow colour, and are succeeded by an oblong, oval, fleshy fruit, shaped like a Plum, including a hard nut of the same form.

The second sort grows naturally in Egypt, where it becomes a tree of middling size. The stem is large and woody; the branches are slender and stiff; they have a green bark while young, and are armed with strong spines; the leaves come out by pairs; they are larger than those of the Box-tree, and end in points, but are of the like consistence and colour. The flowers come out on the side of the branches; they are shaped like those of the Hyacinth, but are small, and of a white colour; these are succeeded by oblong black berries including an oval nut, having one kernel or seed.

Both these sorts are propagated by seeds, which must be procured from the countries where they grow naturally; these should be sown in pots filled with light earth, and plunged into a good hot-bed of tanners bark. If the seeds are fresh, the plants will appear in six weeks or two months. When these are about three inches high, they must be each carefully transplanted into a separate small pot filled with light earth, and plunged into a good hot-bed of tanners bark, where they must be shaded from the sun till they have taken new root; then they must be treated in the same manner as other tender plants from the warm countries. During the first summer they may be kept in the tan-bed under frames, where they will thrive better than in the stove; but in autumn, when the nights grow cool, they should be removed into the stove, and plunged into the tan-bed; and in this they should always be kept, observing to shift them into larger pots when they require it; and in summer, when the season is warm, they should have a large share of free air admitted to them. With this management the plants will thrive well, but they cannot be expected to flower very soon in this country.

XIPHION or XIPHIIUM. Tourn. Inst. R. H. 362. tab. 189. Iris. Lin. Gen. Plant. 57. Bulbous Iris, or Flower-de-luce.

The CHARACTERS are,

The flowers have each a permanent spathe or sheath; they have six petals, the three outer broad, obtuse, and reflexed, the inner erect, pointed, and joined to the other at their base; they have three awl-shaped stamina, which lie upon the reflexed petals, and are terminated by oblong depressed summits, and an oblong germen under the flower, supporting a short style, crowned by a tripartite stigma. The germen afterward becomes an oblong angular capsule with three cells, filled with roundish seeds.

This genus of plants is ranged in the second section of Tournefort's ninth class, which includes the herbs with a Lily flower cut into six parts, whose empalement becomes the fruit. He separates this from Iris, because the root is bulbous, to which we may add, that the leaves are boat-shaped, and the stigma of the flower is long and narrow. Dr. Linnæus joins the plants of this genus, as also the Sisyrinchium and Hermodactylus of Tournefort, to his genus of Iris, and places it in the first section of his third class, which contains those plants whose flowers have three stamina and one style. And although there is no material distinction between the flowers of this genus and those of Iris, yet, as there are many species of the latter, it is better to separate these plants from them, as they differ greatly in their external habit.

The SPECIES are,

1. XIPHIIUM. (*Perficum*) foliis carinatis caule longioribus. *Bulbous Iris, with keel-shaped leaves which are longer than the stalk. Xiphion Perficum præcox, flore variegato. Tourn. Inst. R. H. 363. Early Persian bulbous Iris, with a variegated flower.*
2. XIPHIIUM (*Vulgare*) foliis subulato-canaliculatis, caule brevioribus. *Bulbous Iris, with channelled awl-shaped leaves which are shorter than the stalk. Iris bulbosa, flore cæruleo violaceo. C. B. P. 38. Bulbous Iris with a blue Violet flower.*
3. XIPHIIUM (*Latifolium*) foliis subulato-canaliculatis, flo-

ribus majoribus. *Bulbous Iris, with channelled awl-shaped leaves and larger flowers. Xiphion latifolium, caule donatum, flore cæruleo. Tourn. Inst. R. H. 363. Broad-leaved bulbous Iris, having a stalk and a blue flower.*

4. XIPHIIUM (*Planifolium*) foliis planis caule longioribus. *Bulbous Iris, with plain leaves which are longer than the stalk. Iris bulbosa latifolia, flore cæruleo. J. B. 2. 703. Broad-leaved bulbous Iris, with a blue flower.*

The first sort grows naturally in Persia, but has been many years cultivated in the English gardens for the beauty of its flowers; it has an oval bulbous root, from which come out five or six pale green leaves, which are hollowed like the keel of a boat; they are about six inches long, and one broad at the base, ending in points. Between these the flower-stalk arises, which is seldom above three inches high, supporting one or two flowers, which are included in spathæ (or sheaths); these have three erect petals called standards, which are of a pale sky blue colour, and three reflexed petals called falls, which on their outside are of the same colour; but the lip has a yellow streak running through the middle, and on each side are many dark spots, with one large deep purple spot at the bottom. These flowers have a very fragrant scent, and generally appear in February, which renders them more valuable.

The second sort grows naturally in the warm parts of Europe. There are several varieties of this species: the most common sort is blue, but there is one with a yellow, and another with a white flower; one with a blue flower having white falls, another with yellow falls; one with a Violet-coloured flower having blue falls, with some others; but these are all supposed to be varieties which have been produced by culture.

The root of this is bulbous; the leaves are hollow or channelled, ending in points, where their two sides meet; these are not so long as the flower-stalk which rises between them, and is embraced by the base of the leaves. This supports two or three flowers, which are each inclosed in a separate sheath, at the top of the stalk. The flowers are shaped like those of the first sort, but differ in their colour. This sort flowers in May, and the seeds ripen in August.

The third sort has much larger bulbous roots than either of the former. The leaves are shaped like those of the second sort, but are much larger; the flower-stalk is near twice the height of the second sort, and the flowers are more than double their size. This is by some supposed to be only a variety of the second sort, but I think it a distinct species, for I have many years raised a great number of the plants from seed, and have never found a single one degenerated to the second sort, and have raised many of the second sort from seeds, without one instance of a plant improving to the third sort.

There is a great variety of this species, which differ in the colours of their flowers. Some are of a deep blue, others of a light or sky blue, some of a deep purple, and others with fine variegated flowers, which make a fine appearance during their continuance, which is not long, unless the season proves cold, or the flowers are shaded from the sun. This sort flowers five or six weeks after the second sort, which is also an argument for its being specifically different.

The fourth sort grows naturally in Spain and Portugal. The root of this has a dark-coloured coat, but is white within, and of a sweet taste. The leaves are eight or nine inches long, and more than an inch broad at their base; they are almost plain, but toward their base are hollowed like the keel of a boat, and end in points, being of a pale green on their upper side, and a little hoary on their under. The flowers stand upon naked foot-stalks which arise from the root, and grow five or six inches high, sustaining two or three flowers at the top, which are each wrapped up in a separate sheath; these are shaped like those of the other sorts, and have a very agreeable odour; they appear in May, but are of short duration.

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There are four or five varieties of this species which differ in the colour of their flowers, but the most common colour is blue.

These are propagated by offsets from their roots; but to obtain new varieties, they must be propagated by seeds in the following manner.

Having procured a parcel of seeds from good flowers, the beginning of September you should provide some flat pans or boxes, which must have holes in their bottoms to let the moisture pass off; these should have pieces of tile or oyster shells laid over each hole, to prevent their being stopped; then they must be filled with fresh light sandy earth, and the seeds sown thereon pretty thick, observing to scatter them as equally as possible; then cover them over about half an inch thick with the same light fresh earth, and place the boxes or pans where they may have the morning sun till eleven o'clock; and if the season should prove very dry, they must be now and then refreshed with water.

In this situation they may remain until the middle of October, when they should be removed into a warmer situation, where they may have the full sun most part of the day, and screened from severe frosts; in which place they must abide all the winter, observing to keep them clear from weeds and Moss, which, at this season, are very apt to spread over the surface of the earth in pots, when they are exposed to the open air.

In the spring the plants will appear above ground, when, if the season is dry, they must be now and then refreshed with water, and constantly kept clear from weeds; and as the season advances, and the weather becomes warm, they should be again removed into their former shady situation, where they may enjoy the morning sun only. When the leaves begin to decay (which will be in June,) they must be cleared from weeds and dead leaves, and some fresh earth sifted over them about half an inch thick, still suffering them to abide in the same situation all the summer season; during which time, they will require no farther care but to keep them clear from weeds until the beginning of October, when they must be again removed into a warm situation, and the surface of the earth lightly taken off, and some fresh earth sifted over them.

In this place they must remain all the winter as before, and in the spring they must be treated as was directed for the former years.

When the leaves are decayed, the bulbs should be carefully taken up (which may be best done by sifting the earth through a fine sieve) and a bed or two of good light fresh earth should be prepared, into which the bulbs must be planted, at about three inches asunder each way, and three inches deep. These beds must be constantly kept clean from weeds and Moss; and if the winter should prove severe, the beds should be covered with rotten tanners bark, or Peas haulm, to keep out the frost; and in the spring, just before the plants come up, the surface of the beds should be stirred, and some fresh earth sifted over them about half an inch thick, which will greatly strengthen the roots. During the spring and summer they must be constantly weeded; and at Michaelmas the earth should be again stirred, and some fresh sifted over the beds again, as before, observing in winter and spring still to keep the beds clean, which is the whole management they will require; and in June following the greatest part of the roots will flower, at which time you should carefully look over them, and put down a stick by all those whose flowers are beautiful, to mark them; and as soon as their leaves are decayed, these roots may be taken up to plant in the flower-garden amongst other choice sorts.

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But the nursery-beds should still remain, observing to keep them clear from weeds, as also to sift fresh earth over them, as was before directed; and the following season the remaining part of the roots, which did not flower the foregoing season, will now shew their blossoms; so that you may know which of them are worth preserving in the flower-garden, which should now be marked; and when their leaves are decayed, they must be taken up, and planted with the other fine sorts, in an east border of light fresh earth; but the ordinary sorts may be intermixed with other bulbous rooted flowers in the larger borders of the pleasure-garden, where, during their continuance in flower, they will afford an agreeable variety.

But after these choice flowers are obtained from seeds, they may be increased by offsets, as other bulbous flowers are. The offsets should be planted in a separate border from the blowing roots, for one year, until they have strength enough to produce flowers, when they may be placed in the flower-garden with the old roots.

These bulbs need not be taken up oftener than every other year, which should always be done soon after their leaves decay, otherwise they will send forth fresh fibres, when it will be too late to remove them; nor should they be kept long out of the ground, a month is full enough; for when they are kept longer, their bulbs are subject to shrink, which causes their flowers to be weak the following year.

The earth which the flowers thrive best in, is a light sandy loam; and if it be taken from a pasture ground with the sward, and laid in a heap until the Grass is thoroughly rotted, it will be still better; for these bulbs do not delight in a rich dunged soil, nor should they be planted in a situation where they may be too much exposed to the sun; for in such places their flowers will continue but a few days in beauty, and their roots are apt to decay; but in an east border, where they have the sun until eleven o'clock, they will thrive and flower extremely well, especially if the soil be neither too wet, nor over dry. From the most beautiful of these flowers should seeds be saved, and sown every year, which will always furnish new varieties, some of which will greatly exceed the original kinds.

The Persian Iris is greatly esteemed for the beauty and extreme sweetness of its flowers, as also for its early appearance in the spring, it generally being in perfection in February, or the beginning of March, according to the forwardness of the season, at which time there are few other plants in beauty.

This may be propagated by seeds, in the same manner as the other sorts: but the boxes in which they are sown, should be put under a garden frame in winter, to shelter them from hard frost; because, while the plants are young, they are somewhat tender. From the seeds of this kind I could never obtain any varieties, their flowers being always the same.

These plants are also propagated by offsets, in the same manner as the other sorts, but their roots should not be transplanted oftener than every third year; nor should they be ever kept out of the ground long, because their roots will shrink and entirely decay when they are long above ground, so as not to be recovered again. This sort was formerly more common in the gardens near London than at present; which, I suppose, has been occasioned by the keeping the roots above ground too long, which destroyed them.

XYLON. See BOMBAX.

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YEW-TREE. See TAXUS.
YUCCA. Dillen. Gen. Nov. 5. Lin. Gen.
 Plant. 388. Cordylina. Roy. Lug. Prod. 22.
 The Indian Yucca, or Adam's Needle.

The CHARACTERS are,
The flower has no empalement; it has a bell-shaped flower, composed of six large petals whose tails are joined, and six short reflexed stamina terminated by small summits, and an oblong three-cornered germen which is longer than the stamina, having no style, crowned by an obtuse stigma with three furrows. The germen afterward turns to an oblong three-cornered capsule divided into three cells, filled with compressed seeds, lying over each other in a double arrangement.

This genus of plants is ranged in the first section of Linnaeus's sixth class, which includes those plants whose flowers have six stamina and one style.

The SPECIES are,

1. **YUCCA** (*Gloriosa*) foliis integerrimis. Vir. Cliff. 29. *Yucca with entire leaves.* Yucca foliis Aloës. C. B. P. 91. *Yucca with leaves like those of the Aloe, commonly called Adam's Needle.*
2. **YUCCA** (*Aloifolia*) foliis crenulatis strictis. Lin. Sp. Plant. 319. *Yucca with narrow leaves which are slightly crenated.* Yucca arborecens, foliis rigidioribus rectis ferratis. Dill. Hort. Elth. 435. *Tree-like Yucca with strait, stiff, sawed leaves.*
3. **YUCCA** (*Draconis*) foliis crenatis nutantibus. Lin. Sp. Plant. 319. *Yucca with nodding crenated leaves.* Yucca draconis folio ferrato. Hort. Elth. 437. *Yucca with a sawed Dragon-tree leaf.*
4. **YUCCA** (*Filamentosa*) foliis ferrato-filamentosis. Lin. Sp. Plant. 319. *Yucca with sawed thready leaves.* Yucca foliis filamentosis. Mor. Hist. 2. p. 419. *Thready-leaved Yucca.*

The first of these plants is a native of Virginia, and other parts of North America, but has been long an inhabitant of the English gardens, where it was formerly nursed up in green-houses, supposing it was too tender to live in the open air in winter; but of late years the plants have been planted into the full ground, where they have resisted the greatest cold of our winters where they are in a dry soil.

This sort seldom rises with a stem above two feet and a half or three feet high, which is garnished with leaves almost to the ground. The leaves of this are broad, stiff, and have the appearance of those of the Aloe, but are narrower; they are of a dark green colour, ending in a sharp black spine. This sort frequently produces its panicles of flowers, which rise from the center of the leaves. The stalks grow three feet high; they branch out on every side to a considerable distance, but the flowers are placed very sparsely on the stalks, which renders it less beautiful than the flowers of the other kinds; they are white within, but each petal is marked with a purple stripe on the outside; they are bell-shaped, and hang downward; they appear in August and September, but are not succeeded by seeds in England.

The second sort rises with a thick, tough, fleshy stalk, to the height of ten or twelve feet, having a head or tuft of leaves at the top; these are narrower and stiffer than those of the former sort, and are of a lighter green colour; their edges are slightly sawed, and their points end with sharp thorns. The flower-stalk rises in the center of the leaves, and is from two to three feet long, branching out into a pyramidal form. The flowers grow close on the branches, and form a regu-

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lar spike; they are of a bright purple colour on the outside, and white within, making a fine appearance. The flowers appear at the same time with the former, but the plants of this do not flower so often as the other sort; and when they flower, the head decays, but one or two young heads come out from the side of the stalk, below the old one.

The third sort grows naturally in South Carolina, from whence I received the seeds by the title of Oil Seed. The stalks of this sort rise about three or four feet high; the leaves are narrow, of a dark green colour, and hang downward; they are sawed on their edges, and end in acute spines. I never saw the flowers of this sort, but have been informed they are white.

The threaded sort is not so common as the others in the English gardens, but as it is a native of Virginia, it might easily be procured in plenty from thence. The stalk and leaves are like those of the first sort, but the leaves are obtuse, and have no spines at their ends. The flower-stalk rises five or six feet high, which is generally garnished with flowers most of its length; the flowers are larger and whiter than those of the other species, and sit close to the stalk. From the side of the leaves come out long threads which hang down.

All these plants are either propagated by seed, when obtained from abroad, or else from offsets or heads taken from the old plants, after the manner of Aloes.

When they are raised from seeds, they should be sown in pots filled with light fresh earth, and plunged into a moderate hot-bed, where the plants will come up in five or six weeks after; and when they are two or three inches high, they should be transplanted each into a separate small pot filled with light fresh earth, and plunged into a hot-bed, where the plants should have air and water in proportion to the warmth of the season, and the bed wherein they are placed.

In July they should be inured by degrees to bear the open air, into which they must be removed, to harden them before winter, placing them in a well sheltered situation, where they may remain until the beginning of October, when they must be removed into the green-house, where they may be ranged amongst the hardier sort of Aloes, and should be treated in the same manner as hath been already directed for them; to which the reader is desired to turn, for further instructions.

When these plants have acquired strength, those of the common sort, and also the threaded, may be afterwards turned out into a warm border, where they will endure the cold of our ordinary winters very well, but the other sorts must be kept in pots, that they may be sheltered in winter; and if they are treated in the same way as the large American Aloe, they will do very well.

The offsets taken from the old plants should be laid in a dry place, for a week or ten days before they are planted, that their wounds may heal, otherwise they will be subject to rot with moisture.

As the second and third sorts do not put out offsets so plentifully as the first and fourth, so in order to propagate them, the heads of the plants may be cut off in June; and after the wounded part is dry, the heads may be planted, which will soon take root, provided the pots are plunged into a moderate hot-bed; and this cutting off the heads will occasion the stems to put out suckers, which they seldom do without until they flower; so that by this method, the plants may be obtained in plenty.

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ZANTHOXYLUM. See XANTHOXYLUM.
ZEA. Lin. Gen. Plant. 926. Mays. Tourn.
Inst. R. H. 531. tab. 303, 304, 305. Indian,
or Turkey-corn; in French, *Blé de Turquie*.

The CHARACTERS are,

It has male and female flowers situated at remote distances on the same plant. The male flowers are disposed in a loose spike, having oval, oblong, chaffy empalements, opening with two valves, each inclosing two flowers; these have two short compressed nectariums, and three hair-like stamina, terminated by quadrangular summits, which open in four cells at the top. The female flowers, which are situated below the male, are disposed in a thick spike inclosed with leaves; these have thick chaffy empalements with two valves. The flowers are composed of two short membranaceous broad valves which are permanent, and a small germen, with a slender style, crowned by a single stigma, which is hairy toward the point. The germen afterward turns to a roundish compressed seed, angular at the base, and half inclosed in its proper receptacle.

This genus of plants is ranged in the third section of Linnæus's twenty-first class, which includes those plants which have male and female flowers at distances on the same plant, and the male flowers have three stamina.

The SPECIES are,

1. ZEA (*Americana*) caule altissimâ, foliis latoribus pendulis, spicâ longissimâ. *Indian Corn with the tallest stalk, broader hanging leaves, and the longest spike. Mays granis aureis.* Tourn. Inst. R. H. 531. *Indian Maize with yellow grains.*
2. ZEA (*Alba*) caule graciliore, foliis carinatis, pendulis, spicâ longâ gracili. *Indian Corn with slenderer stalks, keel-shaped hanging leaves; and a long slender spike. Mays granis albicantibus.* Tourn. Inst. R. H. 531. *Indian Maize with white grains.*
3. ZEA (*Vulgare*) caule humiliori, foliis carinatis pendulis, spicâ brevior. *Indian Corn with a lower stalk, hanging keel-shaped leaves, and a shorter spike. Mays spicâ aureâ & albâ.* Tourn. Inst. R. H. 531. *Turkey or Indian Maize, with a yellow and white spike.*

These three species have been generally supposed but one, and no more than accidental variations; but from long experience I can affirm, they are different, and do not alter by culture.

The first sort grows naturally in the islands of the West-Indies; this hath a very large strong stalk, which rises to the height of ten or twelve feet. The leaves are long, broad, and hang downward; they have a broad white midrib. The male flowers come out in branching spikes at the upper part of the stalks; these are eight or ten inches long. The female flowers come out from the bottom of the leaves on the side of the stalk; they are disposed in a close, long, thick spike, and are covered closely with thin spathæ or sheaths; out of the end of these covers hang a small long bunch of filaments or threads, which are supposed receive and convey the farina of the male flowers to the germen of the female. When the seeds of this sort are ripe, the spikes or ears are nine or ten inches long, and sometimes a foot, but these rarely ripen in England.

I have not seen any variety of colours in this species, though it is very probable there are the same varieties

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in the colour of the grain, as in the other species; but as this is less common in Europe, we are not so well acquainted with it:

The second sort is cultivated in Italy, Spain, and Portugal. The stalks of this sort are slenderer than those of the former, and seldom rise more than six or seven feet high. The leaves are narrower than those of the first sort, and are hollowed like the keel of a boat, and their tops hang downwards. The spikes of male flowers are shorter than those of the first, and the ears or spikes of grain are slenderer, and not more than six or seven inches long. The grains of this sort do not come to maturity in England, unless the season proves very warm, and that the grains are planted early in a warm soil and situation.

The third sort is cultivated in the northern parts of America, and also in Germany. The stalks of this are slender, and seldom rise more than four feet high. The leaves are shorter and narrower than those of the two former; they are hollowed like the keel of a boat, and their tops hang down. The spikes of male flowers are short, and the ears or spikes of grain are seldom more than four or five inches long. This sort ripens its grain perfectly well in England, in as little time as Barley, so may be cultivated here to advantage.

There are several varieties of the two last species, which differ in the colour of their grain. The most common colour is that of a yellowish white; but there are some with deep yellow, others with purple, and some with blue grains; and when the different colours are planted near each other, the farina will mix, and the ears will have grains of several colours intermixed on the same spike; but when the grains of the different varieties are planted at a proper distance from each other, the produce will be the same with the grains which were sown. These plants are seldom cultivated in England for use, but in Italy and Germany it is the food of the poor inhabitants; as it is also in many parts of North America, where it is treated in the following manner.

They first dig the ground well in the spring, and after having made it level, they draw a line cross the whole piece intended to be planted; then they raise little hills at about three or four feet distance; into each of which they put two or three good seeds, covering them about an inch thick with earth; then they move the line four feet farther, continuing to do the same through the whole spot of ground; so that the rows may be four feet asunder; and the hills three or four feet distance. Six quarts of this seed is generally allowed to an acre of land; which, if the soil be good, will commonly produce fifty bushels of Corn.

In the planting of this Corn, where they observe to plant the grain of any one colour in a field by itself; and no other coloured grain stand near it, it will produce all of the same colour again; as hath been affirmed by many curious persons who have tried the experiment; but if the rows are alternately planted with the grain of different colours, they will interchange, and produce a mixture of all the sorts in the same row, and frequently on one and the same spike; and some do affirm they will mix with each other, at the distance of four or five rods, provided there is no tall fence or building between to intercept them.

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There is nothing more observed in the culture of this grain, but only to keep it clear from weeds, by frequent hoeing of the ground; and when the stems are advanced, to draw the earth up in a hill about each plant, which, if done, will greatly strengthen them, and preserve the ground about their roots moist for a considerable time.

When the Corn is ripe, they cut off the stalks close to the ground, and after having gathered off the spikes of grain, they spread the stalks in the sun to harden and dry, which they afterward use in the same manner as Reeds in England for making fences, covering sheds, &c. for which purpose they are very useful to the inhabitants of warm countries; and when there is a scarcity of forage, they feed their cattle with them green, as fast as the Corn is gathered off.

The Corn is ground to flour, and the poorest sort of people in America, and also in Italy and Germany, make their bread of this flour; and in many of the warmer countries, the inhabitants roast the whole spikes, and dress them many different ways, making several dishes of it; but this grain seldom agrees with those who have not been accustomed to eat it; however, in times of scarcity of other grain, this would be a better substitute for the poor than Bean flour, or other sorts, which have been used in England; and at all times will be found a hearty food for cattle, hogs, and poultry; so that in light sandy lands, where Beans and Peas succeed not well, this grain may be cultivated to answer both purposes to advantage.

If this grain is cultivated by the horse hoeing husbandry, it may be done at less expence than in any other method; for this is one of the plants which is more particularly adapted for this husbandry; therefore I shall here give an account of the method in which it has been cultivated by the horse-hoe, and has succeeded beyond expectation.

The land was very light and sandy, and far from being rich; this was ploughed deep before winter, and laid up in high ridges till the spring, when it was well harrowed to break it fine, and the beginning of April the ground was again ploughed, laid level, and well harrowed to make the surface smooth; then the seeds were sown in drills, which were made four feet asunder, into which the seeds were dropped at about a foot distance. When the plants were come up three inches high, where any of them were too close, they were cut up with a hand-hoe, and the intervals between the rows were ploughed shallow to destroy the young weeds. But when the stems were advanced, the ground in the intervals was ploughed deeper, and the earth laid up to the plants on both sides; and when the weeds began to grow again, the ground was a third time ploughed to destroy them; this kept the ground pretty clean from weeds till the grain was ripe, as the season was not wet, but otherwise it would have required a fourth ploughing to answer this purpose. The stalks of these plants produced from three to six spikes of grain each, which was a great increase.

The time for sowing this Corn, is about the same as for Barley; in light warm land it may be sown the latter end of March or the beginning of April, but in cold ground, the middle or end of April will be early enough, for the grain is subject to rot in cold land, especially if the season proves wet. When the large sorts are planted in a garden for curiosity, their seeds should be sown upon a moderate hot-bed the beginning of March; and when the plants are fit to remove, they should be transplanted on another moderate hot-bed to bring them forward; but they must not be kept too closely covered, for that will draw them up weak; therefore, when the weather is mild, they should be inured to bear the open air; and the beginning of May they should be taken up with balls of earth to their roots, and transplanted into a warm border at three or four feet distance, carefully watering them if the weather proves dry, until they have taken new root, after which they will require no other care but to keep

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them clean from weeds. If the season should prove warm, these plants will ripen the Corn in autumn.

ZINZIBER. See AMOMUM.

ZIZIPHORA. Lin. Gen. Plant. 33. Clinopodium. Tourn. Inst. R. H. 194. tab. 92. Field Basil.

The CHARACTERS are,

The flower hath a long, rough, cylindrical empalement, which is slightly cut into five parts at the brim. The flower is of the labiated kind, having a long cylindrical tube. The upper lip is oval, reflexed, and entire; the under lip (or beard) is divided into three equal segments; it has two spreading stamina terminated by oblong summits, and a quadrifid germen supporting a bristly style, crowned by a sharp-pointed inflexed stigma. The germen afterward turn to four oblong seeds, which ripen in the empalement.

This genus of plants is ranged in the first section of Linnæus's second class, which includes those plants whose flowers have two stamina and one style.

The SPECIES are,

1. ZIZIPHORA (*Capitata*) capitulis, terminalibus, foliis ovatis. Lin. Sp. Plant. 31. *Field Basil with heads terminating the stalks, and oval leaves.* Clinopodium fistulosum pumilum, Indiæ occidentalis, summo caule floridum. Pluk. Alm. 111. *Low fistulous Field Basil of the West-Indies, having flowers on the top of the stalk.*
2. ZIZIPHORA (*Tenuior*) floribus lateralibus, foliis lanceolatis. Lin. Sp. Plant. 31. *Field Basil with flowers growing on the sides of the stalk, and spear-shaped leaves.* Acinos Syriaca, folio mucronato, capsulis hirsutis. Mor. Hist. 3. p. 404. *Syrian Field Basil with an acute-pointed leaf, and hairy capsules.*
3. ZIZIPHORA (*Hispanica*) floribus lateralibus, foliis inferioribus lineari lanceolatis, summis ovato mucronatis. *Field Basil with flowers growing on the sides of the stalks, the lower leaves linear and spear-shaped, and those on the top oval, terminating with long points.*
4. ZIZIPHORA (*Alpina*) foliis lanceolatis, floribus terminalibus. Hort. Cliff. 305. *Alpine Field Basil with spear-shaped leaves, and flowers terminating the stalks.* Clinopodium Alpinum roseum, saturejæ foliis. Boccon. Mus. 119. *Alpine Field Basil with Rose-like heads and Savory leaves.*

The first sort grows naturally in Virginia; this is an annual plant, which has a four-cornered stalk about four inches high, sending out side branches from the bottom, which stand opposite; these are terminated by a cluster of small flowers surrounded by oval leaves, ending in acute points. The flowers have a slender cylindrical empalement, out of which they just peep; they are purple, of the lip kind, and have but two stamina; it flowers in June, July, and August, and the seeds ripen about six weeks after.

The second sort grows naturally in Spain, and also in the Levant; this sends up many slender ligneous stalks, which rise near a foot high, are garnished with spear-shaped leaves about the size of those of Summer Savory, and have a scent like those. The flowers are produced in whorls round the stalks, which are like those of the former sort, and appear at the same season. The seeds of the third sort I received from Dr. Ruffel, who procured them from Aleppo; this rises about eight or nine inches high; the stalks branch out their whole length. The lower leaves are narrow, and hairy; those at the top are oval, running out in acute points. The flowers are disposed in whorls round the stalks, and are like those of the former sort. The whole plant smells like Pennyroyal.

The fourth sort grows naturally on the Alps, and Appenine mountains. The stalks of this rise about six inches high, and are garnished with small spear-shaped leaves placed opposite. The flowers are produced in a cluster at the top of the stalks, which are of the same shape and colour as those of the first sort, and are surrounded with spear-shaped leaves.

These plants are all of them annual, so are propagated only by seeds.

The seeds may be sown in a border of light earth, either in spring or autumn. Those plants which come

come up in autumn, will abide through the winter, and will grow much larger than those which come up in the spring, though neither of them rise very high. The seeds should be sown where the plants are to remain, for they do not thrive well when they are transplanted, unless the earth remains to their roots. These have a pretty strong aromatic scent, somewhat resembling Summer Savory, but as they are plants of little beauty, they are seldom cultivated but in botanic gardens for variety sake.

The seeds of those plants which come up in autumn, will be ripe in July or August; but those of the spring plants will not ripen till the latter end of August, or the beginning of September; when, if the seeds are permitted to scatter, the plants will come up, and require no farther care but to clear them from weeds, and thin them where they are too close.

ZIZIPHUS. Tourn. Inst. R. H. 627. tab. 403. Rhamnus. Lin. Gen. Plant. 235. The Junjube.

The CHARACTERS are,

The flower has no empalement; it has one funnel-shaped petal, which spreads open at the top, and is cut into four or five segments; it has five awl-shaped stamina, whose base are inserted to the petal, and are terminated by small summits, and an oval germen supporting two slender styles, crowned by obtuse stigmas. The germen afterward becomes an oblong oval berry, inclosing a single nut of the same form, which has two cells, each containing an oblong seed.

This genus of plants is ranged in the seventh section of Tournefort's twenty-first class, which contains the trees and shrubs with a Rose flower, whose pointal turns to a fruit pregnant with a stony seed. Dr. Linnaeus has joined this genus to the Rhamnus, which he ranges in the first section of his fifth class, which contains those plants whose flowers have five stamina and one style; but the flowers of these plants having two styles, the plants should be separated from the Rhamnus.

The SPECIES are;

1. ZIZIPHUS (*Fujuba*) aculeis geminatis rectis, foliis oblongo ovatis serratis. *Fujube with strait thorns growing by pairs, and oblong, oval, sawed leaves.* Ziziphus. Dod. p. 807. *The common Fujube.*
2. ZIZIPHUS (*Sylvestris*) aculeis geminatis, altero recurvo, foliis ovatis nervosis. *Fujube with twin spines, one of which is recurved, and oval veined leaves.* Ziziphus sylvestris. Tourn. Inst. 627. *The wild Fujube.*
3. ZIZIPHUS (*Ænolia*) aculeis solitariis recurvis pedunculis aggregatis, foliis cordato-rotundis nervosis, subtus tomentosis. *Fujube with single recurved spines, foot-stalks in clusters, and round, heart-shaped, veined leaves, which are downy on their under side.* Jujube aculeata, nervosis foliis infra sericeis flavis. Burm. Zeyl. 131. *Prickly Fujube with veined leaves, which are silky and yellow on their under side.*
4. ZIZIPHUS (*Africana*) aculeis geminatis rectis, foliis ovatis nervosis. *Fujube with double strait thorns, and oval veined leaves.* Jujube, f. Ziziphus Africana, mucronatis foliis, spina gemellâ. Pluk. Alm. 199. *African Fujube with pointed leaves and double spines.*

The first sort grows naturally in the warm parts of Europe; it has a woody stalk which divides into many crooked irregular branches, which are armed with strong strait thorns set by pairs at each joint. The leaves are two inches long and one broad, slightly sawed on their edges, and stand upon short foot-stalks. The flowers are produced on the side of the branches, two or three arising from the same place, which sit close; they are small, and of a yellow colour; these are succeeded by an oval fruit, about the size of a middling Plum, of a sweetish taste, and are clammy, including a hard oblong stone, pointed at both ends. The fruit of this tree was formerly used in medicine; it is reckoned pectoral, and good for coughs, pleurisy, and hot sharp humours, but is now seldom to be found in the shops. In Italy and Spain, this fruit is served up at the table in deserts during the winter season, as a dry sweetmeat.

The second sort grows naturally about Tunis in Africa; this has slender woody stalks, which send out many weak branches, covered with a grayish bark, and armed with spines, which come out by pairs at each joint, one of which is longer than the other, and is strait; the other is short and recurved. The leaves are small, oval, and veined; they are half an inch long, and as much in breadth, sitting close to the branches. The flowers of this sort I have not seen, so can give no farther description of this plant.

The third sort grows naturally in India; this rises with shrubby stalks ten or twelve feet high, sending out many slender branches, which have a yellowish bark, and are armed with single recurved thorns at each joint. The leaves are round, heart-shaped, about two inches long, and as much in breadth, and are indented at the foot-stalk; they have three longitudinal veins, and are covered with a yellowish down on their under side. The flowers come out in clusters from the wings of the branches; they are small, and of a yellowish colour; these are succeeded by oval fruit about the size of small Olives, inclosing a stone of the same shape.

The fourth sort grows naturally in Syria, from whence I have received the seeds; this sends up several shrubby stalks from the root, which divide into slender branches, which are armed with strait spines, and are set by pairs at each joint; the leaves are small, oval, and veined, and are placed alternate, standing upon very short foot-stalks. The flowers are small, of a yellow colour, arising from the wings of the branches. The fruit is round, and about the size of Sloes.

These plants are preserved in the gardens of some curious persons only for the sake of variety, for they do not produce fruit in England. The first and fourth sorts, which are the most hardy, will scarcely live thro' the winters in England, even when they are planted against south walls; in which situation I have kept the plants two or three years; when the winters have proved mild, but they were afterward killed by a sharp frost. They may be propagated by putting their stones into pots of fresh light earth, soon after their fruits are ripe; and in winter they should be placed under a common hot-bed frame, where they may be sheltered from severe frost. In the spring these pots should be plunged into a moderate hot-bed, which will greatly forward the growth of the seeds; and when the plants are come up, they should be inured to the open air by degrees, into which they must be removed in June, placing them near the shelter of a hedge; and in very dry weather they must be frequently refreshed with water.

In this situation they may remain till the beginning of October, when they must be removed either into the green-house, or placed under a hot-bed frame, where they may be defended from frost, but should have as much free air as possible in mild weather.

During the winter season they should be now and then refreshed with water; but after their leaves are fallen (as they always shed them in winter), they must not be over watered, which would rot the tender fibres of their roots, and cause the plants to decay.

In March, just before the plants begin to shoot, they should be transplanted, each into a separate small pot filled with light fresh earth; and if they are plunged into a moderate hot-bed, it will greatly promote their taking root; but in May they must be inured to the open air by degrees, into which they should be soon after removed.

Thus these plants should be managed while young, at which time they are tender; but when they are three or four years old, some of them may be planted in the full ground, against a warm wall or pale, where, if they have a dry soil, they will endure the cold of our ordinary winters pretty well; but in hard frosts they will require to be sheltered, so it will be proper to keep a plant or two in pots, which may be housed in winter.

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These plants may be also propagated by suckers, which the old ones many times send forth from their roots, but these are seldom so well rooted as those produced from seeds, nor do they make so good plants, for which reason they are but rarely propagated that way.

The second sort is not so hardy as the first, so these plants must be kept in pots, and in the winter placed into the green-house, and treated in the same way as other hardy exotic plants, being careful not to over-water them at that season, but especially when they have shed their leaves.

This sort is propagated by seeds, which must be procured from the country where it naturally grows; these should be sown in pots filled with light earth, and plunged into a hot-bed of tanners bark, which will bring up the plants in about six weeks, if the seeds are good. When the plants begin to advance in height, they should be gradually hardened, and in June they may be placed in the open air in a sheltered situation; but in autumn they must be removed into shelter, where they must remain all the winter, and in the spring, before the plants begin to push out their leaves, they should be carefully transplanted, each into a separate small pot, and plunged into a gentle hot-bed to forward their putting out new roots. In summer they must be exposed abroad, but in winter they must be housed.

The third and fourth sorts are tenderer than the former, so will not thrive in this country unless the plants are kept in a warm stove. These are propagated in the same way as the former, but the plants must be more tenderly treated, for they should not be wholly exposed abroad at any time of the year; in summer they must have a large share of air in warm weather, and in winter they must be kept in a warm stove.

ZYGOPHYLLUM. Lin. Gen. Plant. 474. Fabago. Tourn. Inst. R. H. 258. tab. 135. Bean Caper.

The CHARACTERS are,

The empalement of the flower is composed of five oval obtuse leaves. The flower has five obtuse petals which are longer than the empalement, and are indented at their points; it has a closed nectarium, which includes the germen, composed of several scales or little leaves, to which the bases of the stamina are fastened; it hath ten awl-shaped stamina, terminated by oblong summits, and an oblong germen, supporting an awl-shaped style, crowned by a single stigma. The germen afterward become an oval five-cornered capsule with five cells, containing several roundish seeds.

This genus of plants is ranged in the first section of Linnæus's tenth class, which includes those plants whose flowers have ten stamina and one style.

The SPECIES are,

1. **ZYGOPHYLLUM** (*Fabago*) foliis petiolatis, foliolis obovatis caule herbaceo. Lin. Sp. 551. *Bean Caper with foot-stalks to the leaves, and herbaceous stalks.* Fabago Belgarum sive peplus Parisiensium. Lugd. 458. *Common Bean Caper, or Peplus of the Parisians.*
2. **ZYGOPHYLLUM** (*Sessilifolium*) foliis sessilibus, foliolis lanceolato-ovalibus margine scabris caule fruticoso. Lin. Sp. 552. *Bean Caper with oval spear-shaped leaves sitting close to the stalks, and a shrubby stalk.* Fabago Africana arborescens, flore sulphureo, fructu rotundo. Com. Plant. Rar. 10. *Tree-like African Bean Caper, with a brimstone flower and a round fruit.*
3. **ZYGOPHYLLUM** (*Morgsana*) foliis subpetiolatis, foliolis obovatis caule fruticoso. Lin. Sp. 551. *Bean Caper with oval small leaves having short foot-stalks, and a shrubby stalk.* Fabago tetraphylla flore tetrapetalo, fructu membranaceo quadrangulati. Burm. Plant. Afr. 7. *Four-leaved Bean Caper with a flower of four petals, and a four-cornered membranaceous fruit.*
4. **ZYGOPHYLLUM** (*Fulvum*) capsulis ovatis acutis. Lin. Sp. Plant. 386. *Bean Caper with oval acute-pointed capsules.* Fabago flore luteo, petalorum unguibus rubris, fructu fulcato acuto oblongo. Burm. Plant. Afr. 6. *Bean Caper with a yellow flower, the tails of the petals red, and an acute, oblong, furrowed fruit.*

The first sort grows naturally in Syria; this has been

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long an inhabitant of some curious gardens in England. The root is thick, fleshy, and strikes deep into the ground, and will grow as thick as a man's arm when old. The stalks decay every autumn to the root, from which spring new shoots every year, in number proportionable to the size of the root; they rise three or four feet high, sending out a few side branches; these are smooth, green, and jointed; they are garnished with smooth fleshy leaves like those of Purslane, two standing together upon the same foot-stalk, which is an inch long; they are of a bluish green colour. The flowers are produced from the wings of the stalk, two or three arising at the same joint upon short foot-stalks; they are composed of five roundish concave petals of a reddish colour on their outside, and ten stamina which are twice the length of the petals. The flowers are succeeded by long prismatical capsules with five sides, which have cells filled with roundish seeds. This sort flowers in June and July, and the seeds ripen in autumn.

The second sort grows naturally at the Cape of Good Hope; this rises with a thick woody stalk three or four feet high, sending out many branches, which are garnished with succulent leaves placed by fours, sitting close to them. From the wings of the stalks the flowers are produced upon pretty long slender foot-stalks; they are composed of five sulphur-coloured petals which have a brown spot on each of their tails; these are succeeded by roundish depressed fruit having five cells, each containing two roundish seeds. This plant continues flowering all summer and autumn, and the seeds ripen in winter.

The third sort grows naturally at the Cape of Good Hope; this has a shrubby stalk which divides into many irregular jointed branches, which rise four or five feet high, and are garnished with thick succulent leaves, which are larger, and more obtuse than those of the second sort; they are placed by fours at each joint, two on each side the stalk opposite. The flowers come out from the wings of the stalk upon slender foot-stalks; these have but four petals, which are broader than those of the second sort, but of the same colour, each having a brown spot at their tails. The fruit has four broad membranaceous wings, resembling the sails of a mill. This plant flowers most part of summer, but the fruit seldom ripens well in England. The fourth sort is a native of the Cape of Good Hope. The stalks of this branch out greatly from the bottom; they are shrubby, jointed, and irregular. The leaves are of the consistence of those of Purslane; they are narrow at their tails, but oval toward their points, and are placed by fours at each joint like the former. The flowers come out from the wings of the stalk upon slender foot-stalks; they are of a pale yellow colour, each petal having a pretty large red spot at their tails. The fruit is oval, about three quarters of an inch long, having five deep furrows, and is divided into five cells, which are filled with roundish seeds. This plant flowers great part of the year, and the fruit ripens in autumn and winter.

The first sort is propagated only by seeds, which ripen very well in England in warm seasons; these may be either sown upon a moderate hot-bed in the spring, or on a warm border of light ground; those which are sown upon the hot-bed will come up in three weeks or a month, and about a month after, the plants will be fit to remove, when they should be each planted in a separate small pot filled with fresh light earth, and plunged into a gentle hot-bed to promote their taking root, and shaded from the sun in the day time; afterward they must be gradually hardened to bear the open air, to which they should be exposed all the summer; but in autumn, when their stalks begin to decay, they should be placed in a hot-bed frame to shelter them from the frost in winter, for while they are young, they are a little tender. The spring following they may be turned out of the pots, and planted in a south border close to the wall, in a dry rubbishy soil, where they will endure the cold without covering.

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ing. There is a plant of this kind in the Chelsea Garden, which is more than fifty years old, and has resisted the severest cold without any covering, and produces great plenty of flowers and fruit annually.

Those plants which come up in the full ground will require no other care but to keep them clean from weeds, and thin them where they come up too close, giving them room to grow the first year; and when their stalks decay in autumn, the surface of the ground should be covered with tan to prevent the frost from penetrating to the roots, or in frosty weather, they may be covered with straw or Peas haulm, which will answer the same purpose, the young plants being somewhat tender; and in the spring, the roots should be carefully taken up, planting them close to a warm wall, as before directed.

The other three sorts are too tender to live through the winter in the open air in this country, so they must be kept in pots, and housed in autumn. These plants may be propagated either by seeds or cuttings.

The second and fourth sorts ripen their seeds pretty well in England, so these may be propagated by sowing them on a moderate hot-bed in the spring; and when the plants are about an inch high, they should be each transplanted into a small pot filled with light earth, and plunged into a moderate hot-bed, shading them from the sun till they have taken new root; then

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as the season advances, they should be gradually hardened to bear the open air, into which they should be removed the latter end of May, placing them in a warm sheltered situation, where they may remain till autumn, when they should be placed in a dry airy glass-case, where they will succeed better than in a green-house; for they require a large share of air in mild weather, otherwise their shoots are apt to be weak and tender, so are often injured by damp air in winter, but they do not require any artificial heat. If they are screened from the frost, and have plenty of air, they will thrive very well.

The third sort seldom produces good seeds in England, so is propagated by cuttings, and the two others are generally increased in the gardens the same way, that method being very expeditious, though the seedling plants grow stronger, and rise to a greater height. These cuttings may be planted in a bed of light earth during any of the summer months; if these are covered close down with bell or hand-glasses, and shaded from the sun, they will put out roots in five or six weeks, and then may be taken up carefully and potted, placing them in the shade till they have taken new root; after which they may be removed to a warm sheltered situation, and treated in the same way as those plants raised from seeds.

ZYLOSTEUM. See LONICERA.



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 Flag, the Corn, see Gladiolus
 Flag, the common, see Iris
 Flag, the sweet-scented, see Acorus
 Flag, the yellow Marsh, see Iris
 Flax, see Linum
 Flax, the Toad, see Linaria
 Fleabane, see Conyza
 Fleabane, the African, see Tarconanthus
 Fleawort, see Psyllium
 Flixweed, see Sifymbrium
 Flower
 Flower-de-luce, see Iris and Xiphion
 Flower gentle, see Amaranthus
 Flower eternal, see Xeranthemum
 Flower everlasting, see Gnaphalium
 Flower-fence, see Poinçiana
 Flower, the four o'Clock, see Mirabilis
 Flower, Sun, see Hælianthus
 Fluelline, see Veronica
 Flywort, or Catchfly, see Lychnis and Silene
 Fools Stones, see Orchis
 Fox-Glove, see Digitalis
 Fountains
 Framboise, see Rubus
 French Cowslip, see Auricula
 French Honeyfuckle, see Hedyfarum
 French Lavender, see Stœchas
 French Marigold, see Tagetes
 French Mercury, see Mercurialis
 French Wheat, see Helxine
 French Willow, see Epilobium
 Friars Cowl, see Arum
 Fringe-tree, see Chionanthus
 Fritillary, see Fritillaria
 Fritillary Craffa, see Stapelia
 Frost
 Fruit
 Fumatory,
 Fumatory, the bulbous-rooted, }
 Fumatory, the Bladder, } see Fumaria
 Fumatory, the podded,
 Furz, see Ulex
 Fustick-tree, see Morus

G.

G A L E, or Sweet Willow, see Myrica

Galingale, see Cyperus
 Galleries
 Gall Oak, see Quercus
 Gardens
 Garlick, see Allium
 Garlick, the Crow, or wild, see Cepa
 Gattion-tree, see Cornus
 Gaule, or Dutch Willow, see Myrica
 Gelder Rose, see Viburnum
 Generation
 Gentian, }
 Gentianella, } see Gentiana
 Germander,
 Germander-tree, }
 Germander, the Water, } see Teucrium
 Gilliflower, see Dianthus
 Gilliflower, the Queen's, see Hesperis
 Gilliflower, the Stock, see Cheiranthus
 Gill-go-by-ground, see Glechoma
 Ginger, see Amomum
 Glade
 Gladwin, see Iris
 Glandulous
 Glass-wort, see Salicornia and Salsola
 Glastenbury Thorn, see Mespilus
 Globe Daisy, see Globularia
 Globe Crowfoot, see Trollius
 Globe Amaranthus, see Gomphrena
 Globe-flower, or Bottle, see Centaurea
 Globe Thistle, see Echinops

Goat's-

I N D E X.

Goat's-beard, see Tragopogon
 Goat's-rue, see Galega
 Goat's-stones, see Orchis
 Goat's-thorn, see Tragacantha
 Gold of Pleasure, see Myagrum
 Goldy-locks, see Chrysocoma
 Golden-flower-gentle, see Amaranthus
 Golden-cups, see Ranunculus and Trollius
 Golden-rod, see Solidago
 Gooseberry, see Grossularia
 Gooseberry of Barbadoes, see Pereskia
 Gooseberry, the American, see Melastoma
 Goose-grass, see Aparine
 Goose-foot, see Chenopodium
 Gorse, or Furz, see Ulex
 Go-to-bed-at-noon, see Tragopogon
 Gourd, }
 Gourd, the bitter, } see Cucurbita
 Gourd, the Indian-tree, see Crescentia
 Gourd, the sour, see Adansonia
 Gout-wort, see Ægopodium
 Grafting
 Grain, the oily, see Sesamum
 Grain, the scarlet, see Opuntia and Quercus
 Grape, see Vitis
 Grape, the Sea-side, see Coccolobus
 Grape Hyacinth, see Muscari
 Grass, see Gramen
 Grass of Parnassus, see Parnassia
 Grass, the three-leaved, see Trifolium
 Grass-vetch, see Lathyrus
 Grass, the Viper's, see Scorzonera
 Gravel
 Gravity
 Graymill, or Gromwell, see Lithospermum
 Greek Valerian, see Polemonium
 Green-house
 Green, the Winter, see Pyrola
 Gromwell, see Lithospermum
 Ground-ivy, see Glechoma
 Ground-Pine, see Teucrium
 Groundsel, see Senecio and Erigeron
 Groundsel, the African, see Cacalia
 Grove
 Guava, see Psidium
 Guinea Corn, see Milium
 Guinea Henweed, see Petiveria
 Guinea Pepper, see Capsicum
 Guinea Wheat, see Zea
 Gum Succory, see Chondrilla

H.

H Air-bell, see Hyacinthus
 Hardbeam, see Carpinus
 Hare's-ear, see Bupleurum
 Hare's-foot Trefoil, see Trifolium
 Hare's-lettuce, see Sonchus
 Hare's-strong, see Peucedanum
 Harmel, see Peganum
 Hartwort, see Tordylium
 Hartwort of Ethiopia, see Bupleurum
 Hart's-horn, see Plantago
 Hart's-tongue, see Lingua Cervina
 Hatchet-vetch, see Securigera
 Hawkweed, see Hieracium
 Hawthorn, see Mespilus
 Hazel, see Corylus
 Hazel, the Witch, see Ulmus
 Heart's-ease, see Viola
 Heath, see Erica
 Heath, the Berry-bearing, see Empetrum
 Heath, the low Pine, see Coris
 Hedges
 Hedge-hog, see Medicago
 Hedge-hog Thistle, see Cactus
 Hedge Hyssop, see Gratiola
 Hedge Mustard, see Erysimum
 Hedge Nettle, see Galeopsis

Hedge Nettle Shrub, see Prasium
 Heliotrope, see Heliotropium
 Heliotrope, or Sunflower, see Helianthus
 Hellebore, the Black, see Helleborus
 Hellebore, the Bastard, see Serapias
 Hellebore, the White, see Veratrum
 Helmet-flower, see Scutellaria
 Hemlock, see Cicuta
 Hemlock, the Bastard, see Ligusticum
 Hemlock, the Water, see Phellandrium
 Hemp, see Cannabis
 Hemp Agrimony, see Eupatorium
 Hemp, the Bastard, see Datisca
 Hemp, the Water, see Bidens
 Henbane, see Hyoscyamus
 Henbane, the yellow, see Nicotiana
 Herb Bennet, see Geum
 Herb Christopher, see Actæa
 Herb Gerard, see Angelica
 Herb of Grace, see Ruta
 Herb Paris, see Paris
 Herb Robert, see Geranium
 Herb Trefoil, see Trifolium
 Herb Trinity, see Viola
 Herb True-love, see Paris
 Herb Two-pence, see Lythymachia
 Herb Willow, see Epilobium
 Hercules's All-heal, see Heracleum and Pastinaca
 Hermodactyl, see Hermodactylus
 Hightaper, see Verbascum
 Hills
 Hog's-fennel, see Peucedanum
 Hog Plum, see Spondias
 Hog Weed, see Boerhaavia
 Hollow-root, see Fumaria
 Hollyhock, see Alcea
 Holly-tree, see Ilex
 Holly, the Knee, see Ruscus
 Holly, the Sea, see Eryngium
 Holm Oak, see Quercus
 Holy Rose, see Cistus
 Holy Thistle, see Cnicus
 Honeyfuckle, see Periclymenum
 Honeyfuckle, the French, see Hedyfarum
 Honeyfuckle, the Trumpet, see Periclymenum
 Honeyfuckle, the upright, see Lonicera
 Honefty, see Lunaria
 Honey-flower, see Melianthus
 Honey-wort, see Cerinthe
 Hone-wort, see Sium
 Hops, see Lupulus
 Hop Hornbeam, see Carpinus
 Hop, the Wild, see Ptelea
 Horehound, see Marrubium
 Horehound, the Black, see Ballote
 Horehound, the Base, see Stachys
 Horehound, the Bastard, see Sideritis
 Horehound, the Water, see Lycopus
 Hornbeam, see Carpinus
 Horizontal Shelters
 Horned Poppy, see Chelidonium
 Horse Chestnut, }
 Horse Chestnut, the scarlet, } see Æsculus
 Horse-mint, see Mentha
 Horse-radish, see Cochlearia
 Hoshoe-vetch, see Hippocrepis
 Horse-tail, see Equisetum
 Horns and Hedgehog, see Medicago
 Hose-in-Hose, see Primula
 Hound's-tongue, see Cynoglossum
 Hot-bed
 Houseleek, see Sedum and Sempervivum
 Humble Plant, see Mimosa
 Hyacinth, see Hyacinthus
 Hyacinth, the Grape, }
 Hyacinth of Peru, } see Muscari
 Hyacinth, the stary, see Ornithogalum
 Hyacinth, the Tuberosa, see Polianthes and Crinum
 Hydrostatics
 Hygrometer

Hyssop

I N D E X.

Hyssop, see Hyssopus
Hyssop, the Hedge, see Gratiola

J.

J Acinth, see Hyacinthus
Jack by the Hedge, see Erysimum
Jack in a Box, see Hernandia
Jacob's Ladder, see Polemonium
Jalap, see Convolvulus
Jalap, the False, see Mirabilis
Jasmine, see Jasminum
Jasmine, the Ilex-leaved, see Lantana
Jasmine, the American scarlet, see Bignonia
Jasmine, the Red of Jamaica, see Plumeria
Jasmine, the Persian, see Syringa
Jasmine, the Fennel-leaved, see Ipomæa
Ice
Ice-House
Jerusalem Artichoke, see Helianthus
Jerusalem Cowslip, see Pulmonaria
Jerusalem Sage, see Phlomis
Jesuits Bark, the False, see Baccharis
Jet-d'eau
Jews Mallow, see Corchorus
Immortal Eagle Flower, see Impatiens
Immortal Flower, see Gnaphalium
Inarching
Indian Arrow-root, see Maranta
Indian Cress, see Tropæolum
Indian Corn, see Zea
Indian Fig, see Opuntia
Indian God-tree, see Ficus
Indian Reed, see Canna
Indigo, see Indigophera
Inoculating
Job's Tears, see Coix
St. John's Bread, see Ceratonia
St. John's Wort, see Hypericum
John's-sweet, see Dianthus
Jonquil, see Narcissus
Iron-wood, see Sideroxylum
Iron-wort, see Sideritis
Jucca, see Yucca
Judas-tree, see Cercis
Jujube, see Ziziphus
Julians, see Hesperis
Juniper, see Juniperus
Jupiter's Beard, see Anthyllis
Ivy-tree, see Hedera
Ivy, the Ground, see Glechoma

K.

K A T K I N

Kidney-bean, see Phaseolus
Kidney-bean Tree, see Glycine
Kidney-wort, see Geum and Cotyledon
King's Spear, see Asphodelus
Kitchen-garden
Knapweed, see Centaurea
Knee-holm, } see Ruscus
Knee-holly, }
Knights-crofs, see Lychnis
Knot-berries, see Rubus
Knot-grafs, see Polygonum
Knot-grafs, the Mountain, see Illecebrum

L.

L Aburnum, see Cytisus
Labyrinth
Ladies Bedstraw, see Gallium
Ladies Bower, see Clematis
Ladies Comb, see Scandix
Ladies Mantle, see Alchemilla
Ladies Seal, see Tamus
Ladies Slipper, see Cypripedium
Ladies Smock, see Cardamine
Ladies Traces, see Orchis

Ladder to Heaven, see Convallaria
Lamb's Lettuce, see Valeriana
Land
Larch-tree, see Larix
Larkspur, see Delphinium
Laserwort, see Laserpitium
Lavender, see Lavendula
Lavender-cotton, see Santolina
Lavender, the French, see Stœchas
Lavender, the Sea, see Limonium
Laurel, } see Padus
Laurel, the Portugal, }
Laurel of Alexandria, see Ruscus
Laurel, the Dwarf, or Spurge, see Daphne
Laurel, the Sea-side, see Phyllanthus
Laurustinus, see Viburnum
Lawn
Layers
Leadwort, see Plumbago
Leaves
Leeks, see Porrum
Legume
Lemon-tree, see Limon
Lemon, the Water, see Passiflora
Lentil, see Ervum
Leopard's-bane, see Doronicum
Lettuce, see Lactuca
Lettuce, the Lamb's, see Valeriana
Lettuce, the Wild, see Prenanthes
Level
Levity
Life Everlasting, see Gnaphalium
Light
Lily, see Lilium
Lily, Asphodel, see Hemerocallis and Crinum
Lily, Daffodil, see Pancratium and Amaryllis
Lily, the Belladonna, see Amaryllis
Lily, the Day, } see Hemerocallis
Lily, St. Bruno's, }
Lily, the Guernsey, see Amaryllis
Lily, Hyacinth, see Scilla
Lily, the May, see Convallaria
Lily, the Mexican, } see Amaryllis
Lily of Japan, }
Lily, the Persian, see Fritillaria
Lily, the Superb, see Gloriosa
Lily, the Water, see Nymphaea
Lime-tree, see Tilia
Lime, the sour, see Limon
Lion's-leaf, see Leontice
Lion's-foot, see Catananche
Lion's-tail, see Leonurus
Liquidamber
Liquorice, see Glycyrrhiza
Liquorice-vetch, see Orobus
Liquorice, the Wild, see Astragalus
Live-ever, see Anacampteros and Sempervivum
Live in Idleness, see Viola
Liverwort, see Hepatica and Lichen
Lizard's-tail, see Saururus
Loam
Locker Goulans, see Trollius
Locust, or St. John's Bread, see Ceratonia
Locust, the Bastard, see Hymenæa
Locust of Virginia, see Gleditsia
Logwood, see Hæmatoxylum
London Pride, see Saxifraga
Looking-glass, Venus's, see Campanula
Loosestrife, see Lythmachia
Loosestrife, the podded, see Epilobium
Loosestrife, the spiked, see Lythrum
Lopping
Lote-tree, see Celtis
Lote, the Bastard, see Diospyrus
Love-apple, see Lycopersicum and Solanum
Love-in-a-mist, see Passiflora
Love-lies-a-bleeding, see Amaranthus
Loveage, see Ligusticum
Loufewart, see Delphinium
Lucern, see Medica

I N D E X.

Lungwort, see Pulmonaria
 Lungwort, Cows, see Verbascum
 Lupine, see Lupinus
 Lustwort, see Drosera

M.

M Accaw-tree, see Palma
 Mad Apple, see Melongena
 Madder, see Rubia
 Madder, Petty, see Asperula
 Madwort, see Alyssum
 Mahogany, see Cedrus
 Maiden Hair, see Adiantum
 Maiden Hair, the Black, see Filicula
 Maiden Hair, the English, see Trichomanes
 Maiden Hair, the White, see Ruta muraria
 Malabar Nut, see Justicia
 Male Balsam Apple, see Momordica
 Mallow, see Malva
 Mallow, the Jews, see Corchorus
 Mallow, the Indian, see Urena and Sida
 Mallow, the Marsh, see Althæa
 Mallow, the Rose, see Alcea
 Mallow, the Syrian, see Hibiscus
 Mallow, the Tree, see Lavatera
 Mallow, the Venetian, see Hibiscus
 Mallow, the Yellow, see Abutilon
 Malt Dust
 Mammea, see Mammea
 Mammea Sapota, see Sapota
 Manchineel Tree, see Hippomane
 Mandrake, see Mandragora
 Mangrove-tree, see Hibiscus
 Mangrove Grape, see Coccolobus
 Mantle, Ladies, see Alchemilla
 Manure
 Maple-tree, see Acer
 Maracock, see Passiflora
 Marigold, see Calendula
 Marigold, the African, see Tagetes
 Marigold, the Corn, see Chrysanthemum
 Marigold, the Fig, see Mesembryanthemum
 Marigold, the French, see Tagetes
 Marigold, the Marsh, see Caltha
 Marjoram,
 Marjoram, the Pot, } see Origanum
 Marjoram, the Wild, }
 Marjoram, the Winter, }
 Marle
 Marsh Elder, see Viburnum
 Marsh Mallow, see Althæa
 Marsh Trefoil, see Menianthes
 Martagon, see Lilium
 Marvel of Peru, see Mirabilis
 Marum, or Mastich, see Satureja
 Master-wort, see Imperatoria and Astrantia
 Mastich, see Satureja
 Mastich-tree, see Pistacia
 Mastich-tree of Jamaica, see Cornus
 Mastich, the Indian, see Schinus
 Matfelon, or Knapweed, see Centaurea
 Maudlin, see Achillea
 May Bush, see Mespilus
 May Lily, see Convallaria
 May Weed, see Anthemis
 Meadow
 Meadow Rue, see Thalictrum
 Meadow Saffron, see Colchicum
 Meadow-sweet, see Spiræa
 Meadow Trefoil, see Trifolium
 Meally-tree, see Viburnum
 Medick, see Medica
 Medick Vetchling, see Onobrychis
 Medick, the Bastard, see Medicago
 Medlar, see Mespilus
 Melancholy Thistle, see Cirsium
 Melilot, see Trifolium
 Melon, the Musk, see Melo
 Melon, the Water, see Anguria

Melon Thistle, see Cactus
 Mercury, see Mercurialis
 Mercury, the English, see Chenopodium
 Mercury, the French, see Mercurialis
 Meu, or Spignel, see Athamanta
 Mezereon, see Daphne
 Microscope
 Mildew
 Milfoil, see Achillea
 Milk-vetch, see Astragalus
 Milk-vetch, the Bastard, see Phaca
 Milkwort, see Polygala and Glaux
 Milkwort, or Wartwort, see Euphorbia
 Millet, see Milium
 Miltwaste, see Asplenium
 Mint, see Mentha
 Mint, the Cats, see Nepeta
 Mistleto, see Viscum
 Mithridate Mustard, see Thlaspi and Iberis
 Mock Orange, see Philadelphus
 Mock Privet, see Phillyrea
 Moneywort, see Lysimachia
 Monkshood, see Aconitum
 Monks Rhubarb, see Rumex
 Moonseed, see Menispermum
 Moonwort, see Lunaria
 Moon Trefoil, see Medica
 Moss, see Muscus
 Motherwort, see Cardiac and Matricaria
 Mother-of-thyme, see Thymus
 Mould
 Mountain Heath, see Saxifraga
 Moth-mullein, see Verbascum
 Mouse-ear, see Hieracium
 Mouse-tail, see Myosurus
 Mugwort, see Artemisia
 Mulberry-tree, see Morus
 Mulberry Blight, see Blitum
 Mullein,
 Mullein, the Moth, } see Verbascum
 Mummy
 Mushroom
 Musk, Hyacinth, see Muscari
 Musk-seed, see Hibiscus
 Mustard, see Sinapis
 Mustard, Bastard Mithridate, see Thlaspi and Iberis
 Mustard, the China, see Sinapis and Brassica
 Mustard, the Hedge, see Erysimum
 Mustard, the Mithridate, see Thlaspi
 Mustard, the Tower, see Turritis
 Mustard, the Treacle, see Thlaspi and Lepidium
 Myrrh, see Myrris
 Myrtle, see Myrtus
 Myrtle, the Dutch, } see Myrica
 Myrtle, the Candleberry, }

N.

N Asberry-tree, see Chrysophyllum
 Nature
 Navelwort, the Bastard, see Crassula
 Navelwort, Venus's, see Cynoglossum
 Navelwort, the Water, see Hydrocotyle
 Navew, see Rapa
 Nectarine
 Negro-oil, see Palma
 Nep, see Nepeta
 Nerves
 Nettle, see Urtica
 Nettle, the Dead, see Lamium
 Nettle, the Hedge, see Galeopsis
 Nettle, the shrubby Hedge, see Prasium
 Nettle-tree, see Celtis
 Nightshade, see Solanum
 Nightshade, the climbing, see Bassella
 Nightshade, the deadly, see Atropa
 Nightshade, the Enchanters, see Circea
 Nightshade, the American, see Piercea
 Nipplewort, see Lapsana
 Nitre

None-

I N D E X.

None-so-pretty, see Saxifraga
 None-such, or Flower of Bristol, see Lychnis
 Northern Aspect
 Nose-bleed, see Achillea
 Nursery
 Nut, the Hazel, see Corylus
 Nut, the Bladder, see Staphylæa
 Nut, the Cocoa, see Coccus
 Nut, the Earth, see Arachis
 Nut, the Peas, see Lathyrus
 Nut, the Physic, see Iatropha
 Nut, the Pig, see Bunium
 Nut, the Malabar, see Justicia
 Nut, the Walnut, see Juglans

O.

OAK,
 Oak, the Evergreen, } see Quercus
 Oak, the Holm,
 Oak of Jerusalem, see Chenopodium
 Oats, see Avena
 Oily-grain, see Sesamum
 Oily-palm, see Palma
 Oleander, see Nerium
 Olive-tree, see Olea
 Olive, the Wild, see Elæagnus
 Olive, the Wild Barbadoes, see Bontia
 Olive, the Spurge, see Daphne
 One Berry, see Paris
 One Blade, see Smilax
 Onion, see Ceba
 Onion, the Sea, see Scilla
 Orach, see Atriplex and Chenopodium
 Orange-tree, see Aurantium
 Orange Mint, see Mentha
 Orange, the Mock, see Philadelphus
 Orchard
 Origany, see Origanum
 Orpine, see Sedum
 Orpine the True, see Telephium
 Orpine the Bastard, see Andrachne
 Osier, see Salix
 Osmund-royal, see Osmunda
 Ox-eye, see Bupthalmum
 Ox-eye Daisy, see Chrysanthemum
 Oxslip, see Primula

P.

PAIGLES, or Cowslip, see Primula
 Palm-tree, } see Palma
 Palmetto,
 Panic, see Panicum
 Panicle
 Pansies, see Viola
 Papaw, see Carica
 Pappose Plants
 Paradise Apple, see Malus
 Parasitical Plants
 Park Leaves, see Hypericum
 Parsley, see Apium
 Parsley, the Bastard, see Cauca
 Parsley, the Fool's, see Æthusa
 Parsley, the Mountain, see Athamanta
 Parsley, the wild milky, see Thesselinum
 Parsley, the Macedonian, see Bubon
 Parsnep, see Pastinaca
 Parsnep, the Cows, see Sphondylium
 Parsnep, the Prickly-headed, see Echinophora
 Parsnep, the Water, see Sium
 Pasque Flower, see Pulsatilla
 Passion Flower, see Passiflora
 Pasture
 Patience, see Rumex
 Pea, see Pisum
 Peach, see Persica
 Peach, the Wolf's, see Lycopersicon
 Pear-tree, see Pyrus

Peas, Earth Nut, } see Lathyrus
 Peas, Everlasting, }
 Peas, the Heart, see Cardiospermum
 Peas, the Pigeon, see Cytisus
 Peas, the winged, see Lotus
 Pedicle
 Pellitory of the Wall, see Parietaria
 Pellitory of Spain, see Anthemis
 Pellitory, the Double, see Achillea
 Penguin, see Karatas
 Pennyroyal, see Pulegium
 Pennywort, see Cotyledon
 Pennywort, the Marsh, see Hydrocotyle
 Peony, see Peonia
 Pepper, the Jamaica, see Caryophyllus
 Pepper, the Poor Man's, see Lepidium
 Pepper, the Indian, see Capsicum
 Pepper, the Wall, see Sedum
 Pepper, the Water, see Persicaria
 Pepper-mint, see Mentha
 Pepperwort, see Lepidium
 Perennial Plants
 Periwinkle, see Vinca
 Pestilencewort, see Petasites
 St. Peter'swort, see Ascyrum and Hypericum
 Petty-whin, see Ulex
 Pheasant's Eye, see Adonis
 Pheasant-eye Pink, see Dianthus
 Physic Nut, see Iatropha
 Pigeon Pea, see Cytisus
 Pilewort, see Ranunculus
 Pimento, or Jamaica Pepper, see Caryophyllus
 Pimpernel, see Anagallis
 Pimpernel, the Water, see Samolus
 Pimpillo, see Opuntia
 Pimpinell, see Pimpinella and Sanguisorba
 Pineaster, see Pinus
 Pine-apple, see Ananus
 Pine, the Dwarf, see Teucrium
 Pine-tree, see Pinus
 Pine, the Wild, see Karatas
 Pink, see Dianthus
 Pipe-tree, see Syringa
 Pipe, the Pudding, see Cassia
 Piperidge-tree, see Berberis
 Pishamin, or Persimon, see Diospyros
 Pistacia
 Pitch-tree, see Abies
 Plane-tree, see Platanus
 Plane-tree, the false, see Acer
 Plant, see Planta
 Plantain,
 Plantain, the Buckshorn, } see Plantago
 Plantain-tree, see Musa
 Plantain Shot, see Canna
 Planting
 Planting reverse
 Pliant-meally-tree, see Viburnum
 Plowing
 Plowman's Spikenard, see Conyza
 Plum-tree, see Prunus
 Plum, the American, } see Chrysobalanus
 Plum, the Black,
 Plum, the Hog, see Spondias
 Plum, the Maiden, see Chrysobalanus
 Plum, the India Date, see Diospyros
 Poccoon, see Sanguinaria
 Pockwood, see Guaiacum
 Poets Rosemary, see Cassia
 Poison Ash, } see Toxicodendron
 Poison Oak,
 Poison Bush, see Tithymalus
 Poke, or Pork Physic, see Phytolacca
 Poley-mountain, see Polium
 Polyanthus, see Primula
 Polypody, see Polypodium
 Pomgranate, see Punica
 Pondweed, see Potamogeton
 Poor Man's Pepper, see Lepidium
 Poplar-tree, see Populus

Poppy

I N D E X.

Poppy, see Papaver
 Poppy, the Horned, see Chelidonium
 Poppy, the Prickly, see Argemone
 Poppy, the Spatling, see Cucubalus
 Potatoes, see Lycopersicon
 Potato, the Spanish, see Convolvulus
 Prickly-pear, see Opuntia and Cactus
 Prick Madam, see Sedum
 Prick Timber, see Euonymus
 Priest's Pintle, see Arum
 Primrose, see Primula
 Primrose-tree, }
 Primrose, the Night, } see Oenothera
 Privet, see Ligustrum
 Privet, the Mock, see Phillyrea
 Pruning
 Pudding-grass, see Pulegium
 Pudding Pipe-tree, see Casia
 Pumpkin, see Pepo
 Purging-nut, see Iatropha
 Purplewort, see Trifolium
 Purslane, see Portulacca
 Purslane, the Sea, see Atriplex and Chenopodium

Q.

Quaking Grass, see Gramen
 Queen's Gilliflower, see Hesperis
 Queen of the Meadow, see Spiræa
 Quick, see Mespilus
 Quickbeam, }
 Quicken-tree, } see Sorbus
 Quince-tree, see Cydonia
 Quincunx

R.

Radiated Flowers
 Radish, see Raphanus
 Radish, the Horse, see Cochlearia
 Ragwort, see Othonna
 Ragged Robin, see Lychnis
 Rain
 Rainbow
 Rampion, see Campanula
 Ramsons, see Allium
 Rape, see Rapa
 Rape, the Wild, see Sinapis
 Rape, the Broom, see Orobanche
 Raspberry, see Rubus
 Rattle-grass, see Rhinanthus
 Redwood, see Ceanothus
 Reed, see Arundo
 Reed, the Indian flowering, see Canna
 Rest-harrow, see Ononis
 Rhubarb, see Rheum
 Rhubarb, the Monk's, see Rumex
 Ribwort, see Plantago
 Rice, see Oryza
 Ripening of Fruit
 Robin, Wake, see Arum
 Rocket, see Eruca
 Rocket, the Corn, see Bunias
 Rocket, the Garden, see Hesperis
 Rocket, the Winter, see Sisymbrium
 Rock-rose, see Cistus
 Roots
 Rose-tree, see Rosa
 Rose-bay, see Nerium
 Rose-campion, see Agrostemma
 Rose, the China, see Hibiscus
 Rose-bay, the Mountain, see Kalmia
 Rose, the Gelder, see Viburnum
 Rose of Jericho, see Anastatica
 Rose, the South Sea, see Nerium
 Rose, the Rock, see Cistus
 Rose-root, see Sempervivum
 Rosemary, see Rosmarinus
 Rue, see Ruta
 Rue, Dog's, see Scrophularia

Rue, the Goat's, see Galega
 Rue, the Meadow, see Thalictrum
 Rue, the Wall, see Ruta muraria
 Rue, the Syrian, see Peganum
 Rupturewort, see Herniaria
 Rush, see Juncus
 Rush, the Flowering, see Butomus
 Rye, see Secale
 Rye-grass, see Gramen

S.

Saffron, see Crocus
 Saffron, the Bastard, see Carthamus
 Saffron, the Meadow, see Colchicum
 Sage, see Salvia
 Sage of Jerusalem, see Phlomis
 Sage, the Indian Wild, see Lantana
 Sage-tree, see Phlomis
 Sage, the Wood, see Teucrium
 Saintfoin, see Onobrychis
 Salt
 Saltwort, see Salicornia and Salsola
 Sallow, see Salix
 Salomon's Seal, see Convallaria
 Samphire, see Crithmum
 Sand
 Sanicle, see Saxifraga
 Sanicle, the Bear's-ear, see Cortusa
 Sap
 Sappadilla, see Chrysophyllum
 Saracens Confound, see Solidago
 Sassafras, see Laurus
 Satin, the White, see Lunaria
 Satyrium, see Orchis
 Sauce-alone, see Erysimum
 Savin, see Juniperus
 Savin, the Indian, see Bauhinia
 Savory, see Satureja
 Saw-wort, see Serratula
 Saxifrage, see Saxifraga
 Saxifrage, the Burnet, see Pimpinella
 Saxifrage, the Golden, see Chrysosplenium
 Saxifrage, the Meadow, see Peucedanum
 Scabious, see Scabiosa
 Scarlet Lychnis, see Lychnis
 Scarlet, Cardinal-flower, see Rapuntium
 Scarlet Oak, see Quercus
 Sciatica Cress, see Lepidium
 Scorching Fennel, see Thapsia
 Scorpion-grass, or Caterpillar, see Scorpiurus
 Scorpion Senna, see Emerus
 Scull-cap, see Scutellaria
 Scurvy-grass, see Cochlearia
 Sea-Buckthorn, see Hippophae
 Sea-Cabbage, see Crambe
 Sea-Colewort, see Convolvulus
 Sea-Lavender, see Limonium
 Sea-Pink, see Statice
 Seeds
 Segments
 Self-heal, see Prunella
 Seminary
 Seminal Leaves
 Sengreen, or Houseleek, see Sedum and Sempervivum
 Senna, the Bastard, see Cassia
 Senna, the Bladder, see Colutea
 Senna, the Jointed-podded, see Coronilla
 Senna, the Scorpion, see Emerus
 Sensitive Plant, see Mimosa
 Sermountain, see Laserpitium
 Serpent's Tongue, see Ophioglossum
 Service-tree, see Sorbus
 Service, the Wild, see Crataegus
 Setwell, see Valeriana
 Setter-wort, or Bear's-foot, see Helleborus
 Shaddock, see Aurantium
 Shave-grass, see Equisetum
 Shepherd's-needle, see Scandix
 Shepherd's-pouch, see Alyssum

Shepherd's

I N D E X.

Shepherd's Staff, see *Dipsacus*
 Side-saddle Flower, see *Sarracena*
 Silk-grass, see *Aloe* and *Apocynum*
 Silk-grass of Virginia, see *Periploca*
 Silver Bush, see *Anthyllis*
 Silver Tree, see *Protea*
 Silver Weed, see *Potentilla*
 Skirret, see *Sium*
 Slipper, the Lady's, see *Cypripedium*
 Sloe-tree, see *Prunus*
 Smallage, see *Apium*
 Snail Trefoil, see *Medicago*
 Snakeweed, see *Biftorta*
 Snakeroot, see *Aristolochia*
 Snakeroot, the Rattle, see *Polygala*
 Snapdragon, see *Antirrhinum*
 Snapdragon of America, see *Ruellia*
 Snap-tree, see *Justicia*
 Sneezewort, see *Achillea*
 Snowdrop, see *Galanthus*
 Sumach, the Myrtle-leaved, see *Coriaria*
 Soldanel, see *Soldanella*
 Soldier, the fresh Water, see *Stratiotes*
 Solstice
 Sopeberry, see *Sapindus*
 Sopewort, see *Saponaria*
 Sorrel, see *Acetosa*
 Sorrel, the Indian, see *Hibiscus*
 Sorrel, the Wood, see *Oxalis*
 Southernwood, see *Abrotanum*
 Sourfop, see *Annona*
 Sowbread, see *Cyclamen*
 Sow-thistle, see *Sonchus*
 Spanish Nut, see *Sisyrinchium*
 Spanish Arbor-vine, see *Convolvulus*
 Spanish Elder, see *Saururus*
 Spanish Rosemary, see *Passerina*
 Spanish Broom, see *Genista* and *Spartium*
 Spanish Picktooth, see *Daucus*
 Spanish Marjoram, see *Urtica*
 Sparrowgrass, see *Asparagus*
 Spatling Poppy, see *Cucubalus*
 Spear, the King's, see *Asphodelus*
 Spearwort, see *Ranunculus*
 Spear-mint, see *Mentha*
 Spearage, see *Asparagus*
 Speedwell, see *Veronica*
 Spiderwort, see *Phalangium*, *Anthericum*, and *Ephemerum*
 Spignel, see *Athamanta*
 Spike Lavender, see *Lavendula*
 Spinach, see *Spinacia*
 Spindle-tree, see *Euonymus*
 Spindle-tree, the African, see *Celastrus*
 Spleenwort, see *Asplenium*
 Spleenwort, the Rough, see *Lonchitis*
 Spoonwort, see *Cochlearia*
 Spurge Laurel, see *Daphne*
 Spurge Olive, see *Cneorum*
 Spurry, see *Arenaria*
 Squashes, see *Cucurbita*
 Squill, see *Scilla*
 Stagshorn-tree, see *Rhus*
 Stamina
 Star-apple, see *Chrysophyllum*
 Star of Bethlehem, }
 Star Hyacinth, } see *Ornithogalum*
 Star of Naples, }
 Star Thistle, see *Centaurea*
 Starwort, see *Aster*
 Starwort, the Yellow, see *Inula*
 Statues
 Stellate Plants
 Stickadore, see *Stoechas*
 Stock-gilliflower, see *Cheiranthus*
 Stock-gilliflower, the Dwarf, see *Hesperis*
 Stone-break, see *Alchemilla*
 Stone-crop, see *Sedum*
 Stone-crop-tree, see *Chenopodium*
 Storax-tree, see *Styrax*

Storax, the Liquid, see *Liquidamber*
 Stove
 Strawberry, see *Fragaria*
 Strawberry Blite, }
 Strawberry Spinach, } see *Blitum*
 Strawberry-tree, see *Arbutus*
 Style, see *Stylus*
 Succory, see *Cichorium*
 Succory, the Gum, see *Chondrilla*
 Sugar-cane, see *Saccharum*
 Sugar-maple, see *Acer*
 Sulphur-wort, see *Peucedanum*
 Sultan-flower, see *Centaurea*
 Sumach,
 Sumach, the Tanners, } see *Rhus*
 Sumach, the Venetian, }
 Snowdrop Tree, see *Chionanthus*
 Summit of Flowers
 Sun
 Sun-dew, see *Drosera*
 Sun-flower, see *Helianthus*
 Sun-flower, the Dwarf, see *Rudbeckia*
 Sun-flower, the Willow-leaved, see *Helenium*
 Sun-spurge, see *Euphorbia*
 Swallow-wort, see *Asclepias*
 Sweet-apple, see *Annona*
 Sweet Johns, }
 Sweet William, } see *Dianthus*
 Sweet William of Barbadoes, see *Ipomoea*
 Sweet Willow, see *Myrica*
 Swines Cress, see *Cochlearia*
 Sycamore,
 Sycamore, the false, } see *Acer*

T.

Tamarind, see *Tamarindus*
 Tamarisk, see *Tamarix*
 Tan
 Tansey, see *Tanacetum*
 Tansey, the Wild, see *Potentilla*
 Tare, see *Vicia*
 Tarragon, see *Abrotanum*
 Tea, the South Sea, see *Cassine*
 Teasel, see *Dipsacus*
 Thermometer
 Thistle, see *Carduus*
 Thistle, the Blessed, see *Centaurea*
 Thistle, the Carline, see *Carlina*
 Thistle, the Distaff, }
 Thistle, the Fish, } see *Atractylis*
 Thistle, the Fuller's, see *Dipsacus*
 Thistle, the Globe, see *Echinops*
 Thistle, the Ladies, see *Carduus*
 Thistle, the Melon, see *Cactus*
 Thistle, the Melancholy, see *Cirsium*
 Thistle, the Milk, see *Carduus*
 Thistle, the Sow, see *Sonchus*
 Thistle, the Star, see *Centaurea*
 Thistle, the Torch, see *Cactus*
 Thorn-apple, see *Datura*
 Thorn, the Black, see *Prunus*
 Thorn, the Box, see *Lycium*
 Thorn, Christ's, see *Paliurus*
 Thorn, Cockspur, see *Mespilus*
 Thorn, the Egyptian, see *Acacia*
 Thorn, the Evergreen, }
 Thorn, the Glastenbury, } see *Mespilus*
 Thorn, the Goat's, see *Tragacantha*
 Thorn, the Haw, see *Mespilus*
 Thorn, the Purging, see *Rhamnus*
 Thorn, the White, see *Mespilus*
 Thorough-wax, see *Bupleurum*
 Three-leaved Grass, see *Trifolium*
 Thrift, see *Statice*
 Throatwort, see *Trachelium* and *Campanula*
 Thunder
 Thyme,
 Thyme, the Lemon } see *Thymus*
 Thyme, the Mastich, see *Satureja*

I N D E X.

Toad-flax, see *Linaria*
 Tobacco, see *Nicotiana*
 Tooth-pick, see *Daucus*
 Tooth-wort, see *Dentaria*
 Tormentil, see *Tormentilla*
 Touch-me-not, see *Impatiens*
 Tower Mustard, see *Turritis*
 Traces, Lady's, see *Orchis*
 Traveller's Joy, see *Clematis*
 Trefoil, see *Trifolium*
 Trefoil, the Bean, see *Cytisus*
 Trefoil, the Bird's-foot, see *Lotus*
 Trefoil, the Marsh, see *Menianthes*
 Trefoil, the Moon, see *Medica*
 Trefoil-shrub, see *Dorycnium* and *Ptelea*
 Trefoil, the Snail, see *Medicago*
 Trefoil, the Star-headed, }
 Trefoil, the Strawberry-headed, } see *Trifolium*
 Treacle Mustard, see *Thlaspi* and *Iberis*
 Tree, the Cork, see *Quercus*
 Tree, the Chaste, see *Vitex*
 Tree Germander, see *Teucrium*
 Tree, the Indian God, see *Ficus*
 Tree, the White-leaf, or Meally, see *Viburnum*
 Tree of Life, see *Thuya*
 True-love, see *Paris*
 Trumpet Flower, see *Bignonia*
 Trumpet Honeyfuckle, see *Periclymenum*
 Tuberoſe, see *Polianthes*
 Tuberoſe Roots
 Tulip, see *Tulipa*
 Tulip, the African, see *Hæmanthus*
 Tulip-tree, see *Tulipifera*
 Tulip-tree, the Laurel-leaved, see *Magnolia*
 Turnhoof, or Ground Ivy, see *Glechonia*
 Turbith, see *Thapsia*
 Turks-cap, see *Lilium*
 Turks-head, see *Cactus*
 Turkey Baulm, see *Dracocephalon*
 Turkey Wheat, see *Zea*
 Turnep, }
 Turnep, the French, } see *Rapa*
 Turnep Cabbage, see *Brassica*
 Turnſol, see *Heliotropium* and *Helianthus*
 Turpentine-tree, see *Pistacia*
 Turpentine, the Venice, see *Larix*
 Tutſan, see *Hypericum*
 Twyblade, see *Ophrys*

V.

Valerian, see *Valeriana*
 Valerian, the Greek, see *Polemonium*
 Vapour
 Vases
 Vegetable
 Vegetation
 Venus Comb, see *Scandix*
 Venus Looking-glaſs, see *Campanula*
 Venus Navelwort, see *Cynogloſſum*
 Verge
 Vervain, see *Verbena*
 Vervain Mallow, see *Alcea*
 Vetch, see *Vicia*
 Vetch, the Bitter, see *Orobus*
 Vetch, the Chichling, }
 Vetch, the Crimſon-graſs, } see *Lathyrus*
 Vetch, the Hatchet, see *Securidaca*
 Vetch, the Horſe-shoe, see *Hippocrepis*
 Vetch, the Kidney, see *Vulneraria*
 Vetch, the Liquorice, see *Glycine*
 Vetch, the Medick, see *Aſtragalus*
 Vetchling, see *Lathyrus*
 Vine, see *Vitis*
 Vine, the Black, see *Tamus*
 Vine, the Spaniſh Arbor, see *Convolvulus*

Vine, the White, see *Bryonia*
 Violet, see *Viola*
 Violet, the Dame's or Queen's, see *Hesperis*
 Violet, the bulbous, see *Galanthus*
 Violet, the Dog's Tooth, see *Erythronium*
 Violet, the Corn or Venus Looking-glaſs, see *Campanula*
 Viper's Bugloſs, see *Echium*
 Viper's Graſs, see *Scorzonera*
 Virgin's Bower, see *Clematis*
 Virginian Silk, see *Periploca*
 Virginian Acacia, see *Robinia*

W.

Wake Robin, see *Arum*
 Walks
 Walls
 Wallflower, see *Cheiranthus*
 Wallwort, or Dwarf Elder, see *Sambucus*
 Walnut, see *Juglans*
 Wartwort, see *Euphorbia*
 Water
 Water Calaminth, see *Mentha*
 Water Crefs, see *Sisymbrium*
 Water Dropwort, see *Oenanthe*
 Water Germander, see *Teucrium*
 Water Hemp Agrimony, see *Bidens*
 Water Horehound, see *Lycopus*
 Water Lily, see *Nymphæa*
 Water Parſnep, see *Sium*
 Water Pepper, see *Perſicaria*
 Way-faring-tree, see *Viburnum*
 Weather
 Weeds
 Weed, the Dyers, }
 Weld, or Would, } see *Reſeda*
 Wheat, see *Triticum*
 Wheat, the Cow, see *Melampyrum*
 Wheat, the French, see *Helxine*
 Wheat the Indian, see *Zea*
 Whicken, or Quickbeam, see *Sorbus*
 Whins, or Goſe, see *Ulex*
 Whortleberry, see *Vaccinium*
 Widow-wail, see *Cneorum*
 Wilderneſs
 Willow-tree, see *Salix*
 Willow, the Dutch, or Sweet, see *Myrica*
 Willow, the French, see *Epilobium*
 Willow Herb, see *Lythrum*
 William, ſweet, see *Dianthus*
 Wind
 Wind Flower, see *Anemone*
 Wind Seed, see *Arctotis*
 Wine
 Winter Aconite, see *Helleborus*
 Winter Cherry, see *Physalis* and *Solanum*
 Winter Crefs, see *Sisymbrium*
 Winter Green, see *Pyrola*
 Witch Hazle, see *Ulmus* and *Hamamelis*
 Woad, see *Iſatis*
 Wolffbane, see *Aconitum*
 Woodbine, see *Periclymenum*
 Woodroof, see *Asperula*
 Wood Sage, see *Teucrium*
 Wood Sorrel, see *Oxalis*
 Woody Nightſhade, see *Solanum*
 Wormwood, see *Abſinthium*
 Woundwort, see *Vulneraria*
 Woundwort, see *Solidago*
 Woundwort of Achilles, see *Achillea*

Y.

YARROW, see *Achillea*
 Yarrow, the Water, see *Hottonia*

A CATALOGUE of such hardy deciduous Trees and Shrubs as will thrive in the open Air in England without Shelter.

In this Catalogue we have only given the generical title of each tree or shrub, and added the numbers as they are marked in the body of the work to the several species, so that they may be readily turned to. To the Latin titles are added the common English names, which may answer the expectations of our readers full as well as if they were inserted at length to each species.

We have also reduced them into one list, and not disposed them in several, according to their different growths, as they were in the former editions of the *Gardeners Dictionary*, but have marked them with the following letters, A B C D. Those marked A are such as grow more than forty feet high; those marked B are such as grow from twenty to forty feet; those marked C rise from ten to twenty-five; and such as are marked D are shrubs of lower growth. To such as produce flowers for ornament or scent, and are worthy of the pleasure-garden, is added the letter F, whereby every person will be capable of selecting such trees and shrubs as are proper for their different purposes.

It is not proposed to insert in this list any of the undershrubs, which are of short duration, such as Southernwood, Rosemary, Lavender, Lavender-cotton, &c. because, whenever these decay, they occasion gaps in the plantation.

<p>A CER, 1. Sycamore, A Acer, 2. Maple, C Acer, 3. Ash-leaved Maple, A Acer, 4. Norway Maple, B Acer, 5. Flowering Maple, C F Acer, 6. Sugar Maple, B Acer, 7. Mountain Maple, C Acer, 8. Italian Maple, A Acer, 9. Montpellier Maple, C Acer, 10. Eastern Maple, C Acer, 11. Oval-leaved Maple, D Æsculus, Horse Chestnut, A F Alnus, 1. Common Alder, B Alnus, 2. Long-leaved Alder, B Alnus, 3. Dwarf Alder, D Amorpha, Bastard Indigo, D F Amygdalus, 1. Almond-tree, C F Amygdalus, 5. Dwarf Almond, D F Andromeda, 2, 3, 5. D Annona, 8. Papaw, C Aralia, 3. Angelica-tree, D</p>	<p>Celtis, 3, 4. C Cephalanthus, Button-tree, D Cerasus, Double-flowering Cherry, C F Cerasus, 4. Perfumed Cherry, D Cerasus, 5. Dwarf Cherry, D F Cercis, 1, 2. Judas-tree, C F Chionanthus, Snowdrop-tree, C F Clethra, D F Colutea, 1. Bladder Sena, C F Colutea, 2, 3. Bladder Sena, D F Coriaria, Myrtle-leaved Sumach, D Cornus, 1, 2, 3, 4, 5, 6. Dogwood, C Cornus, 7. D Corylus, 1, 2, 3. Nut-tree, C Crataegus, 1, 2. B Crataegus, 3, 4. D Cupressus, 4. American deciduous Cypress, A Cydonia, Quince-tree, C Cytisus, 1, 2. Laburnum, B F Cytisus, 3, 5, 12. D F</p>	<p>Frangula, 1, 2. Berry-bearing Alder, D Fraxinus, 1, 4. Ash-tree, A Fraxinus, 2, 3, 5, 6. Ash, B</p>
<p>B.</p>	<p>D.</p>	<p>G.</p>
<p>Baeteria, Allspice, D F Berberis, 1. Barberry, D Betula, 1. Birch-tree, B Bignonia, 3. Catalpa, C F</p>	<p>Daphne, 2, 5, 7, 8. Mezereon, D F Diervilla, D Diospyrus, 1, 2. Date Plum, C</p>	<p>Gleditsia, 1, 2. Three-thorned Aca- cia, C</p>
<p>C.</p>	<p>E.</p>	<p>H.</p>
<p>Carpinus, 1. Hornbeam, A Carpinus, 2, 3, 4. Hop Hornbeam, C Cassine, 1. Cassioberry Bush, D Castanea, 1. Chestnut, A Castanea, 2. Chinquapin, D Ceanothus, 1. Jersey Tea, D F Celtis, 1, 2. Nettle-tree, B</p>	<p>Elæagnus, 1, 2. Wild Olive, C Emerus, 1, 2. Scorpion Sena, D F Euonymus, 1, 2. Spindle-tree, C</p>	<p>Hamamelis, Witch Hazel, D Hibiscus, 1. Althæa Frutex, D F Hippophae, 1, 2. Sea Buckthorn, C Hydrangea, D Hypericum, 3, 4, 6. St. John's Wort, D F</p>
<p>F.</p>	<p>F.</p>	<p>I.</p>
<p>Fagus, Beech-tree, A</p>	<p>Fagus, Beech-tree, A</p>	<p>Johnsonia, D Itea, D F Juglans, 1, 2, 3. Walnut, A Juglans, 4, 5, 6. Hickory Nut, B</p>
<p>Larix, 1. Larch-tree, A</p>	<p>Larix, 1. Larch-tree, A</p>	<p>L.</p>
<p>Magnolia, 1. Sweet Bay, C F 3, 4. B F</p>	<p>Magnolia, 1. Sweet Bay, C F 3, 4. B F</p>	<p>Larix, 1. Larch-tree, A Laurus, 6, 7, 8. C Ligustrum, 1 Privet, C Liquid Amber, 1, 2. B Lonicera, 1, 2, 3, 4, 5, 6, 7. Upright Honeyfuckle, C F</p>
<p>Morus,</p>	<p>Morus,</p>	<p>M. Magnolia, 1. Sweet Bay, C F 3, 4. B F Mespilus, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16. Medlar, B F Mespilus, 17, 18, 19, 20, 21, 22. C F Morus,</p>

CATALOGUE OF PLANTS.

Morus, 6. Mulberry, B
Myrica, 1, 2, 3, 4. Candleberry, C

O.

Ononis, 5. Rest-harrow, C F
Orobus, 10. Caragana, C F

P.

Padus, 1. Bird Cherry, C F 2, 3. B F
Paliurus, Christ's Thorn, C
Pavia, Scarlet Horse-Chestnut, C F
Periclymenum, 5, 6, 7. Honey-
fuckle, C F
Persica, 1. Peach, B F 2, 3. C F
Philadelphus, 1, 2, 3. Syringa, C F
Pistacia, 1, 4. C
Platanus, 1, 2. Plane-tree, A
Populus, 1, 2, 3, 4, 5, 6. Poplar, A
Prinos, 1, 2. C
Ptelea, 1. Trefoil Shrub, C

Q.

Quercus, 1, 2, 5, 9, 13. Oak, A
Quercus, 7, 8, 11, 12, 14, 15. B

R.

Rhamnus, 1, 2, 3. Buckthorn, C
Rhododendron, 1, 2. Rose-laurel, C
Rhus, 1, 2, 3, 4, 5, 6. Sumach,
C F
Robinia, 1, 2. A F 3, 10. Acacia,
C F
Rosa, all the sorts, Rose, D F
Rubus, 5, 6. Bramble, C F

S.

Salix, 1, 2, 3. A 5, 6, 7, 8, 9, 10,
11. Sallow, B
Sambucus, 1. B 2, 3. Elder, C

Sorbus, 1, 2. Service, B
Spartium, 1, 2, 3. Broom, C F
Spiræa, 1, 2, 3, 6, 7, 8. C F
Staphylæa, 1, 2. Bladder-nut, C
Stewartia, C F
Syringa, 1. Lilac, B 2, 3. C F

T.

Tacamahacca, B
Tamarix, 1. Tamarisk, B 2. C
Tilia, 1, 2. Lime-tree, A 3, 4. B
Toxicodendron, 2, 3, 4, 5. Poison
Oak, C
Tulipifera, Tulip-tree, A F

V.

Viburnum, 1, 2, 3, 4. Way-faring-
tree, C F
Vitex, 1, 2. Chaste-tree, C
Ulmus, 1, 2, 3, 4. Elm, A 5. B

A List of climbing shrubby plants, whose branches must be supported to prevent their trailing upon the ground, and which should be fastened to walls, pales, or trellisses.

Bignonia, 1, 2, 5, 6, 8. Trum-
pet-flower.
Ceanothus, 2.
Clematis, 4, 5, 6, 7, 8, 9, 10, 11,
12. Traveller's Joy.
Glycine, 2. Kidney-bean-tree.
Hedera, 1. Ivy.

Jasminum, 1. Jasmine.
Lycium, 6, 7. Boxthorn.
Menispermum, 1, 2, 3. Moonseed.
Mespilus, 6. Medlar.
Passiflora, 2. Passion-flower.
Periclymenum, 1, 2, 5, 6, 7, 8.
Honeyfuckle.

Periploca, 1. Virginia Silk.
Rosa, 8, 9. Rose
Smilax, 1, 2, 3, 4, 9, 11. Rough
Bindweed.
Solanum, 8. Nightshade.
Toxicodendron, 2, 6. Poison Oak.
Vitis, 1, 5. Vine.

A Catalogue of hardy evergreen trees and shrubs.

Those marked with A are such as grow more than forty feet high; those with B are such as grow from twenty to forty feet high; those with C grow from ten to twenty feet; and those marked with D are low shrubs.

Abies, 1, 2, 3, 4, 5. Fir-tree, A
6, 7, 8, 9. B
Alaternus, 1, 2, 3, 4. C
Arbutus, 1, 2. Strawberry, C
Bupleurum, 6. Hare's-ear, D
Buxus, 1, 2. Box, C 3. D
Celastrus, 1. Staff-tree, D
Cistus, 1, 2, 3, 4, 5, 6, 7, 8, 9, 12,
13, 14, 15, 16. Rock-rose, D
Cneorum, Widow-wail, D
Cupressus, 1, 2. Cypress, B 3. C 5. D
Cytisus, 6. Trefoil-tree, D
Daphne, 1, 4. Mezereon, D

Euonymus, 3. Spindle-tree, D
Hedera, Ivy, D
Hypericum, 3, 4, 6. St. John's-
wort, D
Ilex, 1. Holly, B 2, 3. C
Juniperus, 1, 10, 11. Juniper, D 2,
3, 4, 5, 6. C 7, 8, 12, 13. B
Kalmia, 1, 2, 3. Rose-laurel, D
Larix, 3. Cedar of Libanus, A
Laurus, 1, 2. Bay-tree, B
Ligustrum, 2. Privet, C
Magnolia, 2. Laurel-leaved Tulip-
tree, C

Medica, 8. Moon Trefoil, D
Mespilus 6. Pyracantha, C
Padus, 4, 5, 6. Laurel, C
Periclymenum, 1, 8. Honeyfuckle, D
Phillyrea, 1, 2, 3. C 4, 5, 6, 7. D
Pinus, 1, 3, 5, 10, 13. Pine-tree,
A 2, 4, 6, 7, 11. B 8, 9, 14. C
Quercus, 3, 16. Oak, A 17, 20. B
19. C 18
Rosa, 8, 9. Rose, D
Taxus, Yew, B
Thuya, 1, 2. Tree of Life, C
Viburnum, 5, 6. Laurus Tinus, D

A Catalogue of hardy perennial plants, which will thrive in the open borders without any shelter, whose roots do not require to be every year taken out of the ground; these are such as have ornamental flowers, and are proper furniture for the flower-garden.

Aconitum, 1, 2, 3, 4, 5, 7, 8,
9, 10. Wolfsbane.
Adonis, 3. Pheasant-eye
Anthemis, 16, 17. Camomile.
Anthericum, 1, 3. Spiderwort.
Antirrhinum, 3, 4, 5. Snapdragon.
Apocynum, 3. Dogbane
Aquilegia, 1, 2, 3, 4. Columbine.

Aclepias, 6, 9, 10, 11. Swallow-wort.
Asphodelus, 1, 2, 3, 4. King's-spear.
Aster, 1, 2, 4, 5, 6, 7, 8, 9, 10, 12,
14, 15, 16, 17, 18, 19, 20, 21,
22, 23, 24, 25, 26, 27, 28, 29.
Starwort.
Bellis, 3. Daisy.
Chelone, 1, 2, 3.

Coreopsis, 4. Tickseed.
Cyclamen, 1, 2. Sowbread.
Delphinium, 5, 6, 7, 9. Larkspur.
Dianthus, 1, 4. Gilliflower.
Dictamnus, Fraxinella.
Eryngium, 4, 5, 6. Sea Holly.
Fumaria, 3, 7, 8. Fumitory.
Gentiana, 1, 2, 4. Gentian
Helianthus,

CATALOGUE OF PLANTS.

Helianthus, 2. Sunflower.	Lychnis, 1, 2, 3, 4, 5. with double flowers.	Solidago, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31. Golden Rod.
Helleborus, 3, 4, 5, 6. Hellebore.	Meadia.	Thalictrum, 3, 5. Feather'd Columbine.
Hemerocallis, 1, 2, 4. Day Lily.	Monarda, 1, 2. Oswego Tea.	Trachelium. Throatwort.
Hesperis, 1, 2, 4. Rocket, or Dame's Violet.	Ononis, 6, 15. Rest-harrow.	Trollius, 1, 2. Goldyllocks.
Hibiscus, 18. Indian Mallow.	Orobis, 4, 7, 8. Bitter Vetch.	Veratrum, 1, 2, 3, 4. White Hellebore.
Hieracium, 3. Hawkweed.	Pœonia, all the varieties, Piony.	Verbascum, 10. Mullein.
Iberis, 2. Candy Tuft.	Papaver, 7. Poppy.	Veronica, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14. Speedwell.
Inula, 3, 6, 10. Yellow Starwort.	Phlox, 2, 3, 4, 5, 6, 7. Lychnidea.	
Iris, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 16, 17, 18, 19. Flower-de-luce.	Pulmonaria, 3, 6. Lungwort.	
Ixia, 1.	Pulsatilla, all the species. Pasque-flower.	
Lathyrus, 15, 16. Everlasting Pea.	Rudbeckia, 1, 2, 4, 5, 6. Dwarf Sunflower.	
Lupinus, 6. Lupine.		

A List of such plants as will thrive under the shade of deciduous trees; therefore are proper furniture for wilderness quarters.

A Canthus, 1, 2, 3, 4, 5. Bear's-breech.	Aralia, 1, 2.	Hypericum, 7. St. John's Wort.
Aconitum, 6. Wolfsbane.	Convallaria, all the species, Lily of the Valley.	Primula, all the varieties, Primrose.
Actæa, 1, 2, 3. Herb Christopher.	Geum, 1, 2, 3, 4, 5. London Pride.	Vinca, 1, 2. Periwinkle.
Anemone, 1, 2, 3. Anemiony.	Hemerocallis, 3. St. Bruno's Lily.	Viola, 1, 2. with their varieties, Violet.

A Catalogue of plants, which are too tender to live abroad in winter in England; but require no artificial heat; these are commonly called green-house plants; but those whose leaves and stalks are succulent, will succeed better if they are kept in a dry airy glass-case in winter, where they may enjoy the sun and air at all times when the weather is mild.

A Gave, 1, 2, 7. Aloe.	Cotyledon, 4, 5, 6, 7, 8, 9. Navel-wort.	Myrtus, 1, 2, 3, 4, 5, 6, 7. Myrtle.
Aizoon, 1. Evergreen.	Craffula, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.	Nerium, 1, 2, 3. Oleander.
Aloe, 1, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21. Aloe.	Cunonia.	Olea, 1, 2, 3, 4, 5. Olive.
Anthericum, 4, 5, 6, 7, 8, 9. Spider-wort.	Cupressus, 6. Cypress.	Ononis, 4. Rest-harrow.
Antholyza, 1, 2.	Cyclamen, 3, 4, 5, 6. Sowbread.	Opuntia, 1. Indian Fig.
Anthospermum.	Cytifus, 4, 14, 15. Tree Trefoil.	Osteospermum, 2, 3, 4, 5. Hard-seeded Sunflower.
Anthyllis, 6, 7. Jupiter's Beard.	Diosma, 1, 2, 3, 4.	Othonna, 3, 4, 5, 7, 8, 9. Jacobæa.
Arctotis, 2, 3, 4, 5, 6, 7, 8. Wind-feed.	Ebenus, Ebony.	Oxalis, 4, 5, 6. Wood-forrel.
Aristolochia, 4, 5. Birthwort.	Euphorbia, 6, 7, 10, 12, 13, 16.	Palma, 1, 8. Palm.
Asclepias, 12, 13, 14, 15. Swallow-wort.	Ferraria.	Passerina, 1, 2, 3, 4.
Asparagus, 5, 6, 7, 8, 9, 10. Asparagus.	Galenia.	Periploca, 2, 7. Virginia Silk.
Asphodelus, 6. King's Spear.	Geranium, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 43. Cranebill.	Phyllis, 1, 2.
After, 31, 32, 37. Starwort.	Gnaphalium, 10, 16, 18, 20, 21. Cudweed.	Phyllis.
Aurantium, 1, 2, 3, 4, 5. Orange.	Grewia, 1, 2.	Physalis, 2, 3, 4. Winter Cherry.
Baccharis, 1. Ploughman's Spikenard.	Guajacum, 3.	Pistacia, 3, 4, 5.
Bignonia, 5, 12. Trumpet-flower.	Halleria.	Poterium, 3.
Bofia.	Heliotropium, 4, 5, 6. Heliotrope.	Protea, all the species, Silver-tree.
Brabejum.	Hermannia, all the species.	Pforalea, 1, 10.
Bubon, 3, 4. Macedonian Parsley.	Hypericum, 8. St. John's Wort.	Rhus, 8, 9, 10, 11, 12. Sumach.
Buphthalmum, 7, 10, 11, 12. Ox-eye.	Jasminum, 5, 6. Jasmine.	Royena, 1, 2, 3.
Bupleurum, 7. Hare's-ear.	Iberis, 1. Candy-tuft.	Ruscus, 7. Butcher's Broom.
Cacalia, 5, 6, 7, 8. Foreign Colt's-foot.	Inula, 12. Yellow Starwort.	Salvia, 10, 11, 12. Sage.
Calendula, 7, 8. Marigold.	Justicia, 4.	Scabiosa, 17, 18. Scabious.
Calla, Arum.	Ixia, 2, 3, 4, 5, 6, 7, 8.	Schinus, 1. Indian Mastich.
Campanula, 14, 15. Bell-flower.	Kiggelaria.	Sclarea, 15, 16. Clary.
Capparis, 1, 2. Caper.	Laurus, 3, 4, 5, 9. Bay.	Selago.
Celastrus, 3, 4. Staff-tree.	Leonurus, 1, 2. Lion's-tail.	Sempervivum, 5, 6, 7. Houseleek.
Ceratonia, St. John's Bread.	Limon, all the varieties, Lemon.	Sideroxylum, 1, 2. Iron-wood.
Cereus, 11. Torch-thistle.	Lotus, 5, 16. Bird's-foot Trefoil.	Smilax, 15, 16. Rough Bindweed.
Chironia, 1, 2.	Lycium, 1, 2, 3, 4, 7, 8, 9, 10. Boxthorn.	Solanum, 9, 11, 12, 13, 14, 25, 26, 28. Nightshade.
Chrysocoma, 3, 4. Goldyllocks.	Malva, 14. Mallow.	Spartium, 4, 10. Broom.
Cistus, 10, 11, 17, 18. Rock Rose.	Medeola, 1, 2, 3.	Stapelia, 1, 2.
Cliffortia, 1, 2, 3.	Melia, 1, 2. Bead-tree.	Tarconanthus.
Clusia, 1, 2, 3.	Mesembryanthemum, all the species, Ficoides.	Tetragonia, 1, 2, 3.
Convolvulus, 16, 22, 27. Bindweed.	Myrica, 5, 6, 7. Candleberry Myrtle.	Teucrium, 3, 4. Germander.
Coronilla, 1, 2. Jointed podded Colutea.		Vitex, 3. Chaste-tree.

A CATALOGUE of plants, which will not thrive in this country without artificial heat in winter.

Those marked A, should be placed in the bark-stove; and those marked B, will succeed in a moderate warmth.

- A** CACIA, 1, 2, 3, 4, 11, 22. B 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21. Egyptian Thorn, A
 Achyranthes, 1, 2, 3, 4. B
 Adansonia, A
 Adenantha, A
 Æschynomene, 1, 3, 4. Sensitive Plant, A
 Agave, 3, 4, 5, 6, 8. Aloe, B
 Aloe, 2, 7, 22, 24. B
 Alpinia, A
 Amaryllis, 5, 7, 8, 11. Lily Daffodil, B
 Amomum, 1, 2, 3. Ginger, A
 Anacardium, Cashew-nut, A
 Ananas, Pine-apple, A
 Andrachne, 1, 2, 3. A
 Apocynum, 4, 5, 6, 7, 8, 9, 10, 11. Dogbane, B
 Aristolochia, 8, 9, 10, 11, 12, 13. Birthwort, B
 Arum, 10, 11, 13, 14, 15, 16, 17, 18, 19. Wake-robin, A
 Arundo, 4, 5. Reed, A
 Asclepias, 17, 18, 19, 20. Swallow-wort, B
 Banisteria, 1, 2, 3, 4, 5, 6, 7. A
 Barleria, 1, 2, 3. A. 4. B
 Bartramia, A
 Bauhinia, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. A
 Bessleria, 1, 2, 3. A
 Bignonia, 4, 9, 10, 11, 13, 14, 15. Trumpet-flower, A
 Bixa, A
 Bocconia, A
 Bombax, 1, 2. Cotton, A
 Bontia, Wild Olive, B
 Breynia, 1, 2. A
 Brunfelsia, A
 Buddlejia, 1, 2. A
 Cacao, Cocoa, A
 Cactus, 1, 2, 3, 4. Melon Thistle, A. 5, 6. B
 Cæsalpinia, 1, 2. A
 Cameraria, 1, 2. A
 Canna, 2, 3, 4, 5. Flowering-reed, B
 Capparis, 3, 4, 5, 6, 7, 8, 9, 10. Caper, B
 Capsicum, 7, 8, 9, 10. Guinea Pepper, B
 Carica, 1, 2. Papaw, A
 Caryophyllus, 1. Cloves, A. 2, 3, 4, 5. B
 Cassia, 2, 3, 4, 8, 10, 11, 13, 17. A
 Catebæa, A
 Cedrus, 1, 2, 3. Mahogany, B
 Celastrus, 5. Staff-tree, B
 Cerbera, 1, 2, 3. A
 Cereus, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Torch-thistle, B
 Cestrum, 1, 2, 3, 4, 5, 6. B
 Chamærops, 1, 2. B
 Chrysobalanus, 1, 2. A
 Chrysophyllum, 1, 2. A
 Citharexylon, 1, 2. Fiddle-wood, B
 Clusia, 1, 2. A
 Clusia, 4. B
 Coccolobus, Sea-side Grape, A
 Coffee, Coffee, A
 Colococcus, A
 Columnia, A
 Colutea, 5. Bladder Sena, B
 Commelina, 3. B
 Conocarpus, 1, 2. Buttonwood, B
 Convolvulus, 14, 19, 31, 32. Bind-weed, A
 Conyza, 5, 7, 9, 11, 12, 13. Fleabane, B
 Copaiba, A
 Cordia, A
 Cornutia, A
 Coronilla, 7. A
 Costus, A
 Cotyledon, 10. Navelwort, B
 Crateva, 1, 2. A
 Crescentia, 1, 2. A
 Crinum, 1, 2, 3, 4. Lily Hyacinth, B
 Croton, 6, 7, 8, 9, 12. A
 Curcuma, 1, 2. A
 Cynanchum, 4, 6. B
 Cytisus, 16. Bafe Trefoil, B
 Datura, 7. Thorn-apple, B
 Douglassia, A
 Dracontium, 2, 3, 4, 5. Dragon, A
 Durantia, 1, 2, 3. A
 Elæagnus, 3. B
 Ellisea, B
 Emerus, 3. B
 Eretia, A
 Eryngium, 10. Sea-holly, A
 Erythrina, 1, 2, 3, 4, 5, 6. Coral-tree, B
 Euonymus, 4. Spindle-tree, B
 Eupatorium, 6, 10, 11, 14. B
 Euphorbia, 1, 2, 3, 4, 5, 8, 9, 14, 15, 17. Spurge, B
 Fuchsia, B
 Garcinia, Mangosteen, A
 Gesnera, 1, 2. A
 Gnaphalium, 17, 24. Cudweed, B
 Gossipium, 3, 4. Cotton-tree, A
 Guajacum, 1, 2. Lignum Vitæ, A
 Guilandina, 1, 2, 4. A
 Hæmanthus, 1, 2. Blood-flower, B
 Hæmatoxylum, Logwood, A
 Hedyfarum, 6, 7, 8, 16, 18. B
 Helicteres, 1, 2, 3. Screw-tree, A
 Heliotropium, 8, 9, 11. Turnsole, B
 Hernandia, Jack-in-a-Box, A
 Hibiscus, 5, 6, 7, 13, 23. Marsh-mallow, B
 Hippocratea, A
 Hippomane, 1, 2, 3. Mançaneel, A
 Jasminum, 7. Jasmine, A
 Iatropha, 1, 2, 3, 4, 5, 6, 7, 8. A
 Inga, 1, 2. A
 Justicia, 1, 3, 6, 7, 8. A. 5. B
 Karatas, Penguin, A
 Kæmpifera, A
 Lantana, all the species, Viburnum, B
 Laurus, 10. Bay, B
 Lawsonia, 1, 2. B
 Lippia, B
 Loranthus, B
 Malpighia, all the species, American Cherry, B
 Mammea, A
 Maranta, 1, 2. Arrow-root, B
 Melastoma, all the species, B
 Mimosa, 4, 5, 6, 7, 8, 9. A
 Muntingia, 1, 2, 3. B
 Musa, 1, 2. Plantain-tree, A
 Myrtus, 8, 9. Myrtle, B
 Nyctanthes, 1, 2. Arabian Jasmine, A
 Opuntia, 2, 3, 4, 5, 6, 7, 8. Indian Fig, B. 9. A
 Orobus, 11, 12. Bitter Vetch, B
 Oxalis, 7. Wood-forrel, B
 Palma, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14. Palm-tree, A. 19. B
 Pancratium, 3, 4, 5, 6, 7, 8, 9. Sea-Daffodil, A
 Parkinsonia, Jerusalem Thorn, B
 Passiflora, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19. Passion-flower, A
 Paullinia, all the species, B
 Pereeskia, B
 Periclymenum, 2, 3, 4. Honey-suckle, A
 Periploca, 3, 4, 5, 6. Indian Silk, B
 Persea, Avocado Pear, B
 Petrea, A
 Phyllanthus, B
 Physalis, 6, 9. Winter-cherry, B
 Piercea, 1, 2. B
 Piper, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14. A
 Pisonia, Fingrigo, B
 Pistacia, 7, 8. Pistacia-nut, A. 9. B
 Plumbago, 2. Leadwort, B
 Plumeria, 1, 2, 3, 4, 5. B
 Poinçiana, Flower-fence, A
 Pforalea, 3, 6, 8. B
 Ptelea, 2. Trefoil Shrub, B
 Randia, A
 Rhus, 14. Sumach, B
 Rivinia, 1, 2. Currants, A
 Robinia, 4, 5, 6, 7, 8, 9. False Acacia, B
 Rondeletia, 1, 2. A
 Ruellia, 1, 2, 3, 4. Snap-grafs, A
 Saccharum, Sugar-cane, A
 Samida, 1, 2. B
 Sapindus, Sopeberry, B
 Sapota, 1, 2. A
 Schinus, 2. Indian Mastich, A
 Sicyos, 3. A
 Sifyrinchium, 3. Earth-nut, A
 Smilax, 12, 13, 14. Rough Bind-weed, B
 Solanum, 10, 17, 18, 19, 20, 21, 22, 23, 24, 27, 29, 30, 31, 32, 33. Nightshade, B
 Sophora, 2. A
 Spartium, 11. Broom, B
 Suriana, A
 Tabernemontana, 1, 2. A
 Tamarindus, Tamarind-tree, A
 Tetracera, A
 Teucrium, 18, 19. Germander, B
 Theobroma, Bastard Cedar, A
 Tithymalus, Spurge, B
 Toluifera, A
 Tournefortia, 1, 2, 3, 4, 5, 6. A
 Toxicodendron, 8, 9. Poison Oak, B
 Turnera, 1, 2. A
 Vanilla, 1, 2. A
 Vinca, 3. Periwinkle, B
 Urtica, 9. Nettle, B
 Waltheria, 1, 2. A

A CATALOGUE of such Medicinal Plants as may be cultivated in the English Gardens, being hardy enough to bear the cold in the open air. Such of them as grow in the fields, and are generally termed Weeds, are also distinguished with their places of growth, so that any person who is inclinable to cultivate them, may know where to obtain them. The titles of these plants are such as have been adopted in the Dispensaries, and the figures which are added to them, denote the species in the body of this work.

A Broctanum mas angustifolium majus. C. B. P. Southernwood. Sp. 1.
 Absinthium vulgare majus. J. B. Common Wormwood. English. In lanes, and on dunghills. Sp. 1.
 Absinthium Ponticum tenuifolium incanum. C. B. P. Roman Wormwood. Sp. 2.
 Absinthium marinum album. Ger. Sea Wormwood. English. On the sea-shore. Sp. 13.
 Acanthus fativus vel mollis Virgilii. C. B. P. Bear's-breech. Sp. 1.
 Acetosa pratensis. C. B. P. Common Sorrel. English. In meadows, and other pastures. Sp. 1.
 Acetosa arvensis lanceolata. C. B. P. Sheep's Sorrel. English. On dry gravelly soils. Sp. 3.
 Acetosa rotundifolia hortensis. C. B. P. French Sorrel. Sp. 4.
 Acorus verus, five Calamus Aromaticus officinarum. C. B. P. The true Acorus. English. In deep standing waters, but pretty rare. Sp. 1.
 Adiantum foliis longioribus pulverulentis pediculo nigro. C. B. P. Black Maiden Hair. English. In joints of old walls, and on the sides of shady banks.
 Ageratum foliis ferratis. C. B. P. Sweet Maudlin. Achillæa. Sp. 8.
 Agrimonia officinarum. Inst. R. H. Agrimony. English. In woods and shady lanes.
 Alcea vulgaris major. C. B. P. Vervain Mallow. English. In pastures. Malva.
 Alchemilla vulgaris. C. B. P. Ladies Mantle. English. In moist pastures. Sp. 1.
 Alkekengi officinarum. Inst. R. H. Winter Cherry. Physalis. Sp. 1.
 Allium fativum. C. B. P. Garlick. Sp. 1.
 Alsine media. C. B. P. Chickweed. English. In every dunghill, and in every garden.
 Althæa Dioscoridis & Plinii. C. B. P. Marsh Mal-lows. English. In moist lanes in Kent.
 Amaranthus maximus. C. B. P. Flower Gentle. Sp. 5.
 Ammi majus. C. B. P. Bishop's Weed. Sp. 1.
 Anagallis phœniceo flore. C. B. P. The female Pim-pernel. English. On ploughed lands, but pretty rare. Sp. 2.
 Anchusa puniceis floribus. C. B. P. Alkanet. Lytho-spermum.
 Anethum hortense. C. B. P. Dill. Sp. 1.
 Angelica fativa. C. B. P. Angelica. Sp. 1.
 Anonis spinosa, flore purpureo. C. B. P. Rest-harrow. English. On commons, and in other uncultivated places. Ononis. Sp. 1.
 Anthora, seu Aconitum salutiferum. C. B. P. Whole-some Monkshood. Aconitum. Sp. 4.
 Aparine vulgaris. C. B. P. Clivers, or Goose-grass. English. Under hedges, &c.

Apium palustre, & Apium officinarum. C. B. P. Smallage. English. In standing waters. Sp. 4.
 Apium hortense. Ger. Garden Parsley. Sp. 1.
 Apium Macedonicum. C. B. P. Macedonian Parsley. Bubon. Sp. 1.
 Aquilegia sylvestris. C. B. P. Wild Columbine. Eng-lish. In woods, but rare. Sp. 1.
 Aristolochia clematis recta. C. B. P. Creeping Birth-wort. Sp. 3.
 Aristolochia longa vera. C. B. P. Long Birthwort. Sp. 2.
 Aristolochia rotunda, flore ex purpura nigro. C. B. P. Round Birthwort. Sp. 1.
 Artemisia vulgaris major. C. B. P. Mugwort. Eng-lish. On the sides of fields. Sp. 1.
 Arum vulgare. Ger. Wake Robin. English. In woods, and under hedges. Sp. 1.
 Arundo vulgaris, five Phragmites Dioscoridis. C. B. P. The Reed. English. In deep waters. Sp. 1.
 Asarum vulgare. Park. Asarabacca. English. In moist shady places, but rare. Sp. 1.
 Asclepias flore albo. C. B. P. Swallow-wort, or Tame Poison. Sp. 1.
 Asparagus fativus. C. B. P. Sparagus. Sp. 1.
 Asperula, five Rubeola montana odora. C. B. P. Wood-roof. English. In woods and shady places. Sp. 1.
 Asphodelus albus ramosus mas. C. B. P. The true white Asphodel, or King's Spear. Sp. 2.
 Asphodelus luteus, & flore, & radice. C. B. P. Yel-low King's Spear. Sp. 1.
 Asplenium, five Ceterach. J. B. Spleenwort, or Miltwaste. English. On old walls.
 Aster Atticus cœruleus vulgaris. C. B. P. Blue Ira-lian Starwort. Sp. 2.
 Atractylis lutea. C. B. P. Yellow Distaff Thistle. Carthamus. Sp. 2.
 Atriplex hortensis alba, five pallide virens. C. B. P. Garden Orach. Sp. 1.
 Atriplex foetida. C. B. P. Stinking Orach. English. On dunghills, and in cultivated lands. Chenopodium. Sp. 2.
 Balsamita major. Dod. Pempt. Costmary, or Ale-cost. Tanacetum. Sp. 3.
 Bardana vulgaris major. Park. Burdock. English. By the sides of roads. Arctium. Sp. 1.
 Behen album officinarum. J. B. Spatling Poppy. English. On arable land. Cucubalus. Sp. 2.
 Bellis sylvestris, caule folioso, major. C. B. P. Ox-Eye Daisy. English. In Corn-fields, and in pastures. Chrysanthemum. Sp. 2.
 Bellis sylvestris minor. C. B. P. Daisy. English. In Grass-fields. Sp. 1.

Berberis

CATALOGUE OF PLANTS.

- Berberis dumetorum*. C. B. P. The Berberry, or Piridge Bush. English. In some hedges. Sp. 1.
Beta alba vel *pallefcens*, quæ *Cicla officinarum*. C. B. P. The white Beet. Sp. 2.
Beta rubra vulgaris. C. B. P. the Red Beet. Sp. 3.
Betonica purpurea. C. B. P. Wood Betony. English. In woods, &c. Sp. 1.
Biftorta radice minus intorta. C. B. P. Biftort, or Snakeweed. English. In moist meadows. Sp. 1.
Blitum album majus. C. B. P. White Blites. *Amaranthus*. Sp. 8.
Blitum rubrum majus. C. B. P. Red Blites. *Amaranthus*. Sp. 6.
Borago floribus cœruleis. J. B. Borage. English. In arable land. Sp. 1.
Botrys ambrosioides vulgaris. C. B. P. Oak of Jerufalem. *Chenopodium*. Sp. 4.
Brassica capitata alba. C. B. P. Cabbage. Sp. 1.
Bryonia aspera, five *alba*, *baccis rubris*. C. B. P. Briony. English. Under hedges, and on the fides of banks. Sp. 1.
Bryonia lævis, five *nigra*, *ramofa*. C. B. P. Black Briony. English. In woods, and under hedges. *Tamus*. Sp. 1.
Buglossum angustifolium majus. C. B. P. Garden Buglofs. *Anchufa*. Sp. 1.
Buglossum fylvestre minus. C. B. P. Wild Buglofs. English. On arable land. *Lycopsis*. Sp. 1.
Bugula vulgaris. Park. Bugle. English. In moist meadows and woods. Sp. 1.
Bupthalmum cotulæ folio. C. B. P. Ox-eye. *Anthemis*. Sp. 12.
Burfa paftoris major, *folio finuato*. C. B. P. Shepherd's Purfe. English. By the fides of paths every where. Sp. 1.
Buxus arborefcens. C. B. P. The Box-tree. English. On Box-hill, near Darkin in Surry. Sp. 1.
Calamintha vulgaris, vel *officinarum Germaniæ*. C. B. P. Mountain Calamint. English. On uncultivated land. *Meliffa*.
Calamintha pulegii odore, five *Nepeta*. C. B. P. Calamint with the scent of Pennyroyal. English. On the fides of roads, and other uncultivated places. *Meliffa*.
Calamintha arvensis verticillata. C. B. P. Water Calamint. English. By the fides of ditches, and in moist arable land. *Mentha*.
Calcitrapa flore purpureo. Vaill. The Star Thistle. English. On the fides of banks. *Centaurea*. Sp. 40. Lin.
Caltha vulgaris. C. B. P. Marigold. *Calendula*. Sp. 2.
Cannabis fativa. C. B. P. Hemp. English. On dunghills. Sp. 1.
Capparis spinofa, *fructu minore*, *folio rotundo*. C. B. P. Caper. Sp. 1.
Cardamine magno flore purpurafcente. Inst. R. H. Ladies Smock, or Cuckow-flower. English. In meadows. Sp. 1.
Cardiaca. Inst. R. H. Motherwort. English. By the fides of paths. Sp. 1.
Carduus albis maculis notatus, *vulgaris*. C. B. P. Our Lady's Thistle. English. On uncultivated places. Sp. 4.
Carlina acaulos, *magno flore*. C. B. P. The Carline Thistle. Sp. 3.
Carthamus officinarum, *flore croceo*. Inst. R. H. Saffron-flower, or Bastard Saffron. Sp. 1.
Carui. Cæfalp. Caraway. English. On dunghills, but rare. *Carum*. Sp. 1.
Caryophyllata vulgaris. C. B. P. Avens, or Herb Bennet. English. In woods, and under hedges. *Geum*. Sp. 1.
Caryophyllus altis major. C. B. P. Clove Gilliflower. *Dianthus*. Sp. 5.
Centaureum majus, *folio in lacinias plures divifo*. C. B. P. Great Centaury. *Centaurea*. Sp. 3.
Centaureum minus. C. B. P. Centaury. English. In cultivated lands, and in woods. *Gentiana*. Sp. 1.
Cepa vulgaris. C. B. P. Onion.
Chærophyllum fativum. C. B. P. Chervil. Sp. 5.
Chamædrys vulgo vera exiftimata. J. B. Germander. English. On chalky lands. *Teucrium*. Sp. 6.
Chamæmelum nobile, five *Leucanthemum odoratum*. C. B. P. Chamomile. English. On commons and heaths. *Anthemis*. Sp. 2.
Chamæmelum vulgare *Leucanthemum Dioscoridis*. C. B. P. May Weed, Field Chamomile. English. On arable land, and dunghills. *Anthemis*. Sp. 2.
Chamæpitys lutea vulgaris, five *folio trifido*. C. B. P. Ground Pine. English. On arable land. *Teucrium*. Sp. 16.
Chelidonium majus vulgare. C. B. P. Celandine. English. In woods and under hedges. Sp. 1.
Chelidonia, *rotundifolia minor*. C. B. P. Pilewort. English. By the fides of ditches, and other moist places. *Ranunculus*.
Chenopodium folio triangulo. Inst. R. H. Mercury, or Allgood. English. In lanes and unfrequented places. Sp. 1.
Cicer, *fativum*. C. B. P. Cicers, or Chich Peas. Sp. 1.
Cichorum fylvestre, five *officinarum*. C. B. P. Wild Succory. English. In lanes and commons. Sp. 1.
Cicuta major. C. B. P. Hemlock. English. On the fide of banks. *Conium*. Sp. 1.
Cinara hortensis, *foliis aculeatis*, & *non aculeatis*. C. B. P. Artichoke. Sp. 1.
Ciftus mas, *folio oblongo incano*. C. B. P. Holy Rose. Sp. 2.
Ciftus ladinifera Cretica, *flore purpureo*. Tourn. Cor. The Gum Ciftus. Sp. 9.
Cnicus fylvestris hirsutior, five *Carduus Benedictus*. C. B. P. Carduus, or the Blessed Thistle. Sp. 1.
Cochlearia folio subrotundo. C. B. P. Scurvy-grafs. Sp. 1.
Cochlearia folio finuato. C. B. P. Sea Scurvy-grafs. English. In salt marshes. Sp. 2.
Conyza major vulgaris. C. B. P. On dry land. Sp. 1.
Conyza minor, *flore globofo*. C. B. P. Fleabane. English. On chalky uncultivated ground. *Inula*. 6. Lin. Sp. 1.
Coriandrum majus. C. B. P. Coriander. Sp. 1.
Coronopus fylvestris hirsutior. C. B. P. Buckshorn Plantain. English. On commons and uncultivated places. *Plantago*. Lin.
Coronopus Ruellii. J. B. Swines Crefs. English. On moist commons. *Cochlearia*. Lin. Sp. 5.
Corylus fylvestris. C. B. P. Hazel. English. In woods. Sp. 1.
Cotula foetida. Dod. Stinking Chamomile. English. On arable land. *Anthemis*.
Cotyledon major. C. B. P. Navelwort, or Wall Pennywort. English. On the fides of banks, and upon walls, but rare near London. Sp. 1.
Crithmum, five *fœniculum maritimum minus*. C. B. P. Camphire. English. On the rocks by the fea-side. Sp. 1.
Crocus fativus. C. B. P. Saffron. Sp. 1.
Cruciata hirsuta. C. B. P. Crosswort. English. By the fides of hedges. *Valantia*. Lin.
Cucumis fylvestris asinus dictus. C. B. P. Wild Cucumber. *Momordica*. Sp. 4.
Cucumis fativus vulgaris. C. B. P. Garden Cucumber. Sp. 1.
Cupressus meta in fastigium convoluta, quæ *fœmina Plinii*. C. B. P. The common Cypress. Sp. 1.
Cyanus montanus latifolius, vel *verbasculum cyanoides*. C. B. P. The great Blue Bottle. *Centaurea*. Sp. 7.
Cyanus minor, five *fegetum*. C. B. P. The small Blue Bottle. English. Amongst Corn, &c. *Centaurea*. Sp. 11.
Cyclamen hederæ folio. C. B. P. Sowbread. Sp. 1.
Cynoglossum majus vulgare. C. B. P. Hound's-tongue. English. By hedges fides, and in other uncultivated places. Sp. 1.
Cyperus odoratus, *radice longa*, five *Cyperus officinarum*. C. B. P. Long Cyperus.

CATALOGUE OF PLANTS.

Daucus foliis fœniculi tenuissimis. C. B. P. *Daucus* of Crete, or Candy Carrot. *Athamanta.* Sp. 2.

Daucus vulgaris. Clus. Hist. Wild Carrot, or Bird's-nest. English. On the side of paths in fields, and other uncultivated places. Sp. 1.

Delphinium majus, five vulgare. Park. Larkspur. In Cambridgeshire plentifully. Sp. 1.

Dens leonis latiore folio. C. B. P. Dandelion. English. On walls, and in Grass fields every where. *Léontodon.* Sp. 1.

Digitalis purpurea, folio aspero. C. B. P. Fox-glove. English. On the sides of banks, in woods, and in other uncultivated places. Sp. 1.

Dipsacus fativus. C. B. P. The manured Teasel. Cultivated in some western counties in England. Sp. 2.

Dipsacus sylvestris, aut Virga pastoris major. C. B. P. The wild Teasel. English. On dry banks. Sp. 1.

Doronicum radice scorpii. C. B. P. Leopard's-bane. Sp. 1.

Dracunculus polyphyllus. C. B. P. Dragons. Arum. Sp. 8.

Echium vulgare. C. B. P. Viper's Bugloss. English. On fallowed land, and amongst the Corn. Sp. 1.

Elatine folio subrotundo. C. B. P. Fluellin, or female Speedwell. English. On arable land. *Antirrhinum.* Lin.

Endivia latifolia fativa. C. B. P. Endive. *Cichorium.* Sp. 4.

Equisetum palustre, longioribus setis. C. B. P. Horsetail. Eng. By the side of ditches, and other moist places.

Eruca latifolia alba, fativa Dioscoridis. C. B. P. Rocket. Sp. 1.

Eryngium maritimum. C. B. P. Eryngo. English. On the side of sea-shores. Sp. 1.

Erysimum vulgare. C. B. P. Hedge Mustard. English. On walls, and by the way-sides, very common. Sp. 1.

Eupatorium cannabinum. C. B. P. Hemp-leaved Agrimony. English. By the sides of ditches, and standing waters. Sp. 1.

Euphrasia officinarum. C. B. P. Eyebright. English. In commons, and uncultivated fields. Sp. 1.

Faba. C. B. P. The Garden Bean. Sp. 1.

Faba minor, five Equina. C. B. P. The Horse Bean. Sp. 2.

Filipendula vulgaris, a Molon Plinii. C. B. P. Dropwort. English. On commons, &c. *Spiræa.* Sp. 10.

Filix ramosa major, pinnulis obtusis non dentatis. C. B. P. Female Fern. English. On commons and heaths. Sp. 1.

Filix non ramosa dentata. C. B. P. The male Fern. English. On the side of banks, and in woods. Sp. 2.

Fœniculum vulgare Germanicum. C. B. P. Fennel. English. On uncultivated ground. Sp. 1.

Fœniculum dulce. C. B. P. Sweet Fennel. Sp. 3.

Fœnum Græcum fativum. C. B. P. Fenugreek. *Trigonella.* Sp. 1.

Fragaria vulgaris. C. B. P. Strawberry. English. In woods. Sp. 1.

Frangula, seu Alnus nigra, baccifera. Park. Berry-bearing Alder. English. In moist woods. Sp. 1.

Fraxinella. Clus. Hist. *Fraxinella,* or white Dittany. *Dictamnus.* Sp. 1.

Fumaria officinarum, & Dioscoridis. C. B. P. Fumitory. English. On arable land. Sp. 1.

Galega vulgaris. C. B. P. Goat's-rue. Sp. 1.

Galium luteum. C. B. P. Ladies Bedstraw, or Cheese-rennet. English. On the side of banks, in meadows. Sp. 1.

Genista angulosa & scoparia. C. P. B. Broom. English. On commons, &c. *Spartium.* Sp. 5.

Gentiana major lutea. C. B. P. Gentian, or Fellwort. Sp. 1.

Geranium folio malvæ rotundo. C. B. P. Dove's-foot Crane's-bill. English. On the sides of banks.

Geranium molchatum. C. B. P. Musk Crane's-bill. English. In unfrequented lanes, but rare. Sp. 17.

Geranium Robertianum primum. C. B. P. Herb Robert. English. By hedges.

Glycyrrhiza siliquosa, vel Germanica. C. B. P. Liquorice. Sp. 1.

Gnaphalium vulgare majus. C. B. P. Cudweed. English. On commons, &c. *Filago.* Lin.

Gramen caninum arvense, five Gramen Dioscoridis. C. B. P. Dog Grass, or Couch Grass. English. On arable land every where.

Gratiola centauroides. C. B. P. Hedge Hyssop. Sp. 1.

Grossularia spinosa fativa. C. B. P. Gooseberry. Sp. 1.

Harmala. Dod. Pemp. Wild Rue. *Peganum.* Lin. Sp. *Hedera arborea.* C. B. P. Ivy. English. Climbing on trees. Sp. 1.

Hedera terrestris vulgaris. C. B. P. Ground Ivy, or Alehoof. English. Under hedges, and on bank-sides. *Glechoma.* Lin.

Helenium vulgare. C. B. P. Elecampane. *Inula.* Sp. 1.

Helleborus albus, flore subviridi. C. B. P. White Hellebore. *Veratrum.* Sp. 1.

Helleborus niger, flore roseo. C. B. P. Black Hellebore. Sp. 3.

Hepatica flore simplici cæruleo. Clus. Hist. Noble Liverwort. Sp. 1.

Herba Paris. Ger. Herb Paris, One-berry, or True-love. English. In shady woods. *Paris.* Sp. 1.

Herniaria glabra. J. B. Rupturewort. Sp. 1.

Hieracium majus, folio fœnchi. C. B. P. Hawkweed. English. On the way-sides, pretty common.

Hordeum distichum. C. B. P. Barley. Sp. 1.

Horminum Sclarea dictum. C. B. P. Clary. *Sclarea.* Sp. 1.

Horminum sylvestre, lavendulæ flore. C. B. P. Wild Clary. English. On uncultivated fields. Sp. 1.

Hyacinthus oblongo flore cæruleus major. C. B. P. Hair-bells. English. In woods, and under hedges. Sp. 1.

Hyoscyamus albus major. C. B. P. White Henbane. Sp. 1.

Hyoscyamus vulgaris niger. C. B. P. Black Henbane. English. On commons, and uncultivated land. Sp. 1.

Hypericum vulgare. C. B. P. St. Johnswort. English. Under hedges, and by the way-sides. Sp. 1.

Hyssopus officinarum, cærulea seu spicata. C. B. P. Hyssop. Sp. 1.

Jasminum vulgatius, flore albo. C. B. P. Jasmine. Sp. 1.

Iberis latiore folio. C. B. P. Sciatica Cress. *Lepidium.* Sp. 4.

Imperatoria major. C. B. P. Masterwort. Sp. 1.

Iris alba Florentina. C. B. P. Orris.

Iris vulgaris Germanica, five sylvestris. C. B. P. Garden Flower-de-luce. Sp. 2.

Iris sylvestris fœtida. Inst. R. H. Stinking Gladwin. English. In woods, and most uncultivated places. Sp. 19.

Iris palustris lutea. Ger. Bastard Acorus. English. In standing waters. Sp. 1.

Isatis fativa vel latifolia. C. B. P. Woad. Sp. 1.

Juniperus vulgaris fruticosa. C. B. P. Juniper. English. On heaths. Sp. 1.

Kali majus, cochleato semine. C. B. P. Glass-wort. *Salsola.* Sp. 3.

Lactuca fativa. C. B. P. Lettuce. Sp. 1.

Lamium album, non fœtens, folio oblongo. C. B. P. White Archangel. English. Under hedges. Sp. 2.

Lamium purpureum fœtidum, folio subrotundo, five Galeopsis Dioscoridis. C. B. P. Red Archangel, or Dead Nettle. English. On the sides of banks. Sp. 1.

Lapathum folio acuto plano. C. B. P. Sharp-pointed Dock. English. In fields and uncultivated places. Sp. 4.

Lapathum aquaticum, folio cubitali. C. B. P. The great Water Dock. English. In standing waters. Sp. 3.

Lapathum hortense rotundifolium, five montanum. C. B. P. Bastard Monks Rhubarb. *Rumex.* Sp. 2.

Lapathum folio acuto, rubente. C. B. P. Bloodwort. English. On the way-side.

Lapathum hortense, folio oblongo, five secundum Dioscoridis. C. B. P. Patience. *Rumex.* Sp. 1.

CATALOGUE OF PLANTS.

Lapathum hortenſe latifolium. C. B. P. True Monks Rhubarb.

Lapathum præſtantiffimum, *Rhabarbarum officinarum dictum*. Morif. Rhapontic. Rheum. Sp. 2.

Lavendula anguſtifolia. C. B. P. Lavender. Sp. 2.

Lavendula latifolia. C. B. P. Lavender Spike. Sp. 1.

Laureola ſempervirens, flore viridi, quibuſdam *Laureola mas*. J. B. Spurge Laurel. Engliſh. In woods. *Daphne*. Sp. 2.

Laureola folio deciduo, flore purpureo, officinis. *Laureola fœmina*. C. B. P. Mezereon, or Spurge Olive. *Daphne*. Sp. 1.

Laurus vulgaris. C. B. P. The Bay. Sp. 2.

Lens vulgaris. C. B. P. The Lentil. Sp. 1.

Lenticula paluſtris vulgaris. C. B. P. Duck's Meat. Engliſh. On the ſurface of ſtanding waters every where.

Lepidium latifolium. C. B. P. Dittander, or Pepperwort. Engliſh. On uncultivated ground, but not very common. Sp. 1.

Leucoium incanum majus. C. B. P. Stock-gillflower. *Cheiranthus*. Sp. 6.

Leucoium luteum vulgare. C. B. P. Wall-flower. Engliſh. On old walls and buildings. *Cheiranthus*. Sp. 3.

Leviſticum vulgare. C. B. P. Lovage. *Liguiſticum*. Sp. 1.

Lichen terreſtris cinereus. Raii Syn. Aſh-coloured Ground Liverwort. Engliſh. On heaths and commons.

Liguiſtrum Germanicum. C. B. P. Privet. Engliſh. In hedges. Sp. 1.

Lilium album, flore erecto, & vulgare. C. B. P. The White Lily. Sp. 1.

Lilium convallium album. C. B. P. Lilies of the Valley. Engliſh. In ſhady woods. *Convallaria*. Sp. 1.

Limonium maritimum majus. C. B. P. Sea Lavender. Engliſh. In the ſalt marſhes. Sp. 1.

Linaria vulgaris lutea, flore majore. C. B. P. Toad-flax. Engliſh. On the ſide of banks. Sp. 1.

Lingua cervina officinarum. C. B. P. Hart's-tongue. Engliſh. On the walls of wells, and other moiſt places.

Linum fativum. C. B. P. Flax. Sp. 1.

Linum pratense, floſculis exiguis. C. B. P. Mountain or purging Flax. Engliſh. In meadows and paſtures. Sp. 13.

Lithospermum majus erectum. C. B. P. Gromwill, or Graymill. Engliſh. On uncultivated land. Sp. 1.

Lotus hortenſis odora. C. B. P. Sweet Trefoil. *Trifolium*. Sp. 12.

Lunaria racemofa minor. C. B. P. Moonwort. Engliſh. On commons and heaths.

Lupinus fativus, flore albo. C. B. P. White Lupine. Sp. 5.

Lupulus mas & fœmina. C. B. P. Hop.

Lycopersicon fructu ceraſi. Inſt. R. H. Love Apple. Sp. 1.

Lyſimachia lutea major. C. B. P. Loofeftrife. Engliſh. On the ſide of ditches. Sp. 1.

Majorana vulgaris. C. B. P. Sweet Marjoram. *Origanum*. Sp. 7.

Malva ſylveſtris, folio ſinuato. C. B. P. Mallow. Engliſh. On banks and uncultivated places. Sp. 1.

Malva roſea, folio ſubrotundo. C. B. P. Hollyhock. *Alcea*. Sp. 1.

Mandragora fructu rotundo. C. B. P. Mandrake. Sp. 1.

Marrubium album vulgare. C. B. P. White Horehound. Engliſh. On dry chalky land. Sp. 1.

Marrubium nigrum foetidum. Ballote *Dioſcoridis*. C. B. P. Black or ſtinking Horehound. Engliſh. On banks, and by the way-ſide. *Ballotte*. Sp. 1.

Marum vulgare. Ger. Herb Maſtich, or Maſtich Thyme. *Satureja*. Sp. 4.

Marum Syriacum vel Creticum. H. L. Marum, or Syrian Maſtich. *Teucrium*. Sp. 7.

Matricaria vulgaris, vel fativa. C. B. P. Feverfew. Eng. On dunghills, and in unfrequented places. Sp. 1.

Melilotus officinarum Germaniæ. C. B. P. Melilot. Engliſh. By the ſide of cultivated fields. *Trifolium*. Sp. 11.

Meliſſa hortenſis. C. B. P. Balm. Sp. 1.

Mentha anguſtifolia ſpicata. C. B. P. Mint, or Spear-mint. Sp. 1.

Mentha rotundifolia paluſtris, ſeu aquatica major. C. B. P. Water-mint. Engliſh. In ditches and ſhallow waters. Sp. 11.

Mentha ſpicis brevioribus & habitioribus, foliis menthæ fuſcæ, ſapore fervido piperis. Raii Syn. Peppermint. Engliſh. In watery places. Sp. 6.

Mentha ſylveſtris, longiore folio. C. B. P. Horſe-mint. Engliſh. In uncultivated places. Sp. 4.

Mercurialis teſticulata ſive mas, & ſpicata, ſive fœmina *Dioſcoridis* & *Plinii*. C. B. P. French Mercury. Engliſh. On the way-ſide. Sp. 2.

Mespilus apii folio, ſylveſtris, ſpinofa, ſive oxyacantha. C. B. P. The White Thorn, or Hawthorn. Engliſh. In hedges. Sp. 4.

Mespilus vulgaris. J. B. The common Medlar. Sp. 1.

Meum foliis anethi. C. B. P. Mew, or Spignel. *Athamanta*. Sp. 1.

Milium ſemine luteo vel albo. C. B. P. Millet. Sp. 1.

Millefolium vulgare album. C. B. P. Yarrow, Milfoil, or Noſebleed. Engliſh. By the path-ſides every where. *Achillea*. Sp. 1.

Myrrhis magno ſemine longo fulcato. J. B. Sweet Cicely, or ſweet Fern. *Scandix*. Sp. 5.

Napus fativus. C. B. P. Sweet Navew, or French Turnep. *Rapa*. Sp. 2.

Napus ſylveſtris. C. B. P. Wild Navew, or Cole-feed. Engliſh. On banks. *Rapa*. Sp. 3.

Nasturtium aquaticum ſupinum. C. B. P. Water Crefs. Engliſh. In ditches and ſtanding waters. *Sisymbrium*. Sp. 1.

Nasturtium hortenſe vulgatum. C. B. P. Garden Crefs. Sp. 1.

Nepeta major vulgaris. Park. Nep, or Cat-mint. Engliſh. On chalky dry fields. Sp. 1.

Nicotiana major latifolia. C. B. P. Tobacco. Sp. 2.

Nigella flore minore ſimplici candido. C. B. P. Fennel-flower. Sp. 3.

Ocimum vulgatius. C. B. P. Baſil. Sp. 1.

Olea fativa. C. B. P. The Olive-tree. Sp. 1.

Ophiogloſſum vulgatum. C. B. P. Adder's-tongue. Engliſh. In moiſt meadows.

Orchis morio mas, foliis maculatis. C. B. P. Male Satyrium, or Fools-ftones. Engliſh. In woods and moiſt meadows. Sp. 2.

Orchis morio fœmina. C. B. P. Female Satyrium. Engliſh. In meadows. Sp. 1.

Origanum ſylveſtre, cunila bubula *Plinii*. C. B. P. Wild Marjoram. Engliſh. On dry uncultivated places. Sp. 1.

Origanum onites. C. B. P. Origany of Crete. Sp. 6.

Orobis filiquis articulatis, ſemine majore. C. B. P. Bitter Vetch. *Ervum*. Sp. 5.

Osmunda regalis. Ger. Flowering Fern, or Oſmund-royal. Sp. 1.

Oxys. Inſt. R. H. Wood Sorrel, Engliſh. In moiſt woods. *Oxalis*. Sp. 1.

Pæonia fœmina, flore rubro majore. C. B. P. Piony. Sp. 2.

Pæonia folio nigricante ſplendido, quæ mas. C. B. P. Male Piony. Sp. 1.

Panax coloni, & *marrubium aquaticum acutum*. Ger. Clowns All-heal. Engliſh. By the ſides of ditches, and other watery places. *Stachys*. Sp. 8.

Panax Paſtinacæ folio. C. B. P. Hercules's All-heal. *Paſtinaca*. Sp. 3.

Paniculum Germanicum, ſive panicula minore. C. B. P. Panic. Sp. 1.

Papaver hortenſe, ſemine albo. C. B. P. White Poppy. Sp. 9.

Papaver hortenſe, ſemine nigro. C. B. P. Black Poppy. Sp. 8.

Papaver erraticum, *Rhoias Dioſcoridi*, *Theophrasto*, *Plinio*. C. B. P. Red Poppy. Engliſh. On arable land. Sp. 1.

CATALOGUE OF PLANTS.

Parietaria officinarum. C. B. P. Pellitory of the wall. English. On walls. Sp. 1.

Paronychia rutaceo folio. Ger. Rue-leaved Whitlow Grass. Eng. On walls and buildings. *Saxifraga*. Lin.

Pastinaca sativa latifolia. C. B. P. Parsnep. Sp. 2.

Pastinaca sylvestris latifolia. C. B. P. Wild Parsnep. English. On uncultivated places. Sp. 1.

Pentaphylloides argentea dicta. Raii Syn. Silver Weed, or wild Tansey. English. On moist commons, and by the sides of ditches. *Potentilla*. Sp. 1.

Perfoliata vulgarissima, five *arvensis*. C. B. P. Thorough Wax. English. On arable land. *Bupleurum*. Sp. 1.

Periclymenum non perfoliatum Germanicum. C. B. P. Honeyfuckle. English. In hedges. Sp. 5.

Perficaria mitis maculosa. C. B. P. Spotted Arfesmart. English. On dunghills. Sp. 2.

Perficaria urens, seu *Hydropiper*. C. B. P. Arfesmart, or Water Pepper. English. By the side of ditches, and in other watery places. Sp. 1.

Petasites major & vulgaris. C. B. P. Butter-bur. English. By ditch-sides. Sp. 1.

Peucedanum Germanicum. C. B. P. Hog's-fennel, or Sulphur-wort. English, but very rare. Sp. 1.

Phellandrium, vel *cicutaria aquatica quorundam*. J. B. Water Hemlock. English. In standing waters.

Pilosella major repens hirsuta. C. B. P. Mouse-ear. English. On walls and dry gravelly commons.

Pimpinella sanguisorba minor. C. B. P. Burnet. English. On chalky ground. *Potentilla*. Sp. 1.

Pimpinella saxifraga major, umbella candida. C. B. P. Burnet Saxifrage. English. Under hedges, and by the side of fields. Sp. 2.

Pimpinella saxifraga major altera. C. B. P. The lesser Burnet Saxifrage. English. In pastures. Sp. 1.

Pisum arvense, flore candido, fructu rotundo albo. C. B. P. Peas. Sp. 1.

Plantago latifolia sinuata. C. B. P. Plantain. English. In moist places.

Plantago angustifolia major. C. B. P. Narrow-leaved Plantain, or Ribwort. English. On dunghills, and by the way-side every where.

Plumbago quorundam. Clus. Hist. Toothwort, or Leadwort. Sp. 1.

Polium maritimum erectum Monspeliacum. C. B. P. Poley Mountain. Sp. 4.

Polium angustifolium Creticum. C. B. P. Poley of Crete. Sp. 5.

Polygonatum latifolium vulgare. C. B. P. Solomon's Seal. English. In some woods, but not common. *Convallaria*. Sp. 3.

Polygonum latifolium. C. B. P. Knot-grass. English. In uncultivated places.

Polypodium vulgare. C. B. P. Polypody. English. On shady banks and walls. Sp. 1.

Porrum commune capitatum. C. B. P. The Leek. Sp. 1.

Portulaca latifolia, seu *fativa*. C. B. P. Purslane. Sp. 1.

Primula veris. Inst. R. H. Primrose. English. In woods, and under hedges. *Primula*. Sp. 1.

Primula veris major. Ger. Cowslip, or Paigles. English. In meadows. *Primula*. Sp. 2.

Prunella major, folio non dissecto. Self-heal. English. In meadows, and pasture land. Sp. 1.

Prunus sylvestris. C. B. P. The Sloe-tree. English. In hedges. Sp. 1.

Psyllium majus erectum. C. B. P. Fleawort. Sp. 1.

Parmica vulgaris, folio longo serrato, flore albo. J. B. Sneezewort. English. In woods, and under hedges. *Achillea*. Sp. 10.

Pulegium latifolium. C. B. P. Pennyroyal. English. On moist commons. Sp. 1.

Pulegium angustifolium. C. B. P. Hart's Pennyroyal. Sp. 3.

Pulmonaria maculosa latifolia. Park. Spotted Lungwort, or Jerusalem Sage. Sp. 1.

Punica fativa. Inst. R. H. Pomegranate. Sp. 1.

Punica sylvestris, flore pleno majore. Inst. R. H. The Wild Pomegranate with a large double flower. Sp. 2.

Pyrethrum Hispanicum. C. B. P. Pellitory of Spain. *Anthemis*. Sp. 11.

Pyrola rotundifolia major. C. B. P. Winter Green. In shady woods in the north of England. Sp. 1.

Quinquefolium majus repens. C. B. P. Cinquefoil. English. In pastures. *Potentilla*. Lin.

Ranunculus pratensis, radice verticilli modo rotundo. C. B. P. Crowfoot. English. In pastures.

Ranunculus apii folio, lævis. C. B. P. Marsh Crowfoot. English. Very common in standing waters.

Rapa rotunda fativa. C. B. P. Turnep. Sp. 1.

Raphanus minor oblongus. C. B. P. Radish. Sp. 1.

Raphanus rusticanus. C. B. P. Horse-radish. English. On dunghills, and by the sides of fields. *Cochlearia*. Sp. 5.

Rhamnus catharticus. C. B. P. Buckthorn. English. In hedges. Sp. 1.

Rhus folio ulmi. C. B. P. Sumach. Sp. 1.

Ribes vulgare, fructu rubro. H. L. Red Currants. Sp. 1.

Ros folio folio rotundo. C. B. P. Rosa-folis, or Sundew. English. On commons where there are bogs.

Rosa alba vulgaris major. C. B. P. The White Rose. Sp. 16.

Rosa Damascena, flore pleno. Hort. Eyft. The Damask Rose. Sp. 15.

Rosa rubra multiplex. C. B. P. The Red Rose. Sp. 20.

Rosa sylvestris vulgaris, flore odorato, incarnato. C. B. P. The Dog Rose, or Wild Briar. English. In hedges. Sp. 1.

Rosmarinus hortensis, angustiori folio. C. B. P. Rosemary. Sp. 1.

Rubia tinctorum fativa. C. B. P. Madder. Sp. 1.

Rubis vulgaris, five *rubus fructu nigro*. C. B. P. The Bramble, or Blackberry. English. Very common in hedges. Sp. 1.

Rubus Idæus spinosus, fructu rubro. J. B. Raspberry Bush. English. In some woods. Sp. 3.

Ruscus myrtifolius aculeatus. Inst. R. H. Knee-holm, or Butcher's Broom. English. In woods, and on commons. Sp. 1.

Ruscus latifolius, fructu folio innascente. Inst. R. H. Horse-tongue, or Double-tongue. Sp. 2.

Ruscus latifolius, fructu folio infidente. Inst. R. H. The Bay of Alexandria. Sp. 3.

Ruta hortensis latifolia. C. B. P. Rue. Sp. 1.

Ruta muraria. C. B. P. White Maiden Hair, or Wall Rue. English. On walls, and other buildings, in moist places.

Sabina folio tamarisci Dioscoridis. C. B. P. Savin. Sp. 1.

Salvia nigra. C. B. P. Common Red Sage. Sp. 1.

Salvia minor, aurita & non aurita. C. B. P. Sage of Virtue. Sp. 3.

Sambucus fructu in umbella nigro. C. B. P. Elder. English. In hedges. Sp. 1.

Sambucus racemosa rubra. C. B. P. Mountain Elder. Sp. 3.

Sambucus humilis, five *ebulus*. C. B. P. Dwarf Elder, or Danewort. English, but not common near London. Sp. 4.

Sanicula officinarum. C. B. P. Sanicle. English. In woods and shady places.

Santolina foliis teretibus. R. H. Lavender-cotton. Sp. 1.

Saponaria major lævis. C. B. P. Sopswort. English. On the side of banks. Sp. 1.

Satureja hortensis, five *Cunila fativa Plinii*. C. B. P. Savory. Sp. 1.

Satureja montana durior. C. B. P. Winter Savory. Sp. 3.

Saxifraga rotundifolia alba. C. B. P. White Saxifrage. English. In meadows. Sp. 1.

Scabiosa pratensis hirsuta, quæ officinarum. C. B. P. Scabious. English. On arable land. Sp. 1.

Scabiosa radice succisa, flore globoso. Raii Syn. Devil's Bit, or Wood Scabious. English. In woods, and under hedges. Sp. 2.

Scordium

CATALOGUE OF PLANTS.

Scordium legitimum. Park. Scordium, or Water
Germander. English. In watery places, but not com-
mon. *Teucrium*. Sp. 13.

Scordium alterum, five *salvia agrestis*. C. B. P. Wood
Sage. English. In woods, and on heaths. *Teucrium*.
Sp. 12.

Scorzonera latifolia sinuata. C. B. P. Scorzonera, or
Viper Grass. Sp. 1.

Scrophularia nodosa foemina. C. B. P. Figwort.
English. In woods and shady places. Sp. 1.

Scrophularia aquatica major. C. B. P. Water Fig-
wort, or Water Betony. English. By the side of
ditches. Sp. 2.

Secale hybernum vel majus. C. B. P. Rye. Sp. 1.

Sedum majus vulgare. C. B. P. Housleek. English.
On house-tops and walls. *Sempervivum*. Sp. 12.

Sedum minus teretifolium album. C. B. P. Lesser
Housleek. English. On walls; &c. Sp. 1.

Sedum minus vermiculatum acre. C. B. P. Wall
Pepper, or Stone-crop. English. On walls and build-
ings. Sp. 5.

Senecio minor vulgaris. C. B. P. Groundsel. English.
On walls, and on arable lands, and also on bye-paths
every where.

Serpyllum vulgare minus. C. B. P. Mother-of-thyme.
English. On heaths and commons. *Thymus*. Sp. 6.

Seseli pratense, *Silaus forte Plinio*. C. B. P. Meadow
Saxifrage. English. In moist pastures.

Siler montanum majus. Mor. Umb. Siler Mountain,
Bastard Lovage, or common Hartwort. Sp. 1.

Sinapi rapi folio. C. B. P. Mustard. English. On
dunghills, &c. *Sinapis*. Sp. 2.

Sinapi hortense, *femine albo*. C. B. P. White Mus-
tard. *Sinapis*. Sp. 1.

Sisarum Germanorum. C. B. P. Skirret. *Sium*. Sp. 4.

Sium latifolium. C. B. P. Broad-leaved Water Pars-
nep. English. In standing waters. Sp. 1.

Sium aromaticum, *Sison officinarum*. Inst. R. H.
The German, or common Amomum. English. Under
hedges, and in shady lanes. *Sison*. Sp. 1.

Smyrnium. Matth. Alexanders. English. By the side
of fields, but not common. Sp. 1.

Solanum hortense. Ger. Nightshade. English. On
dunghills. Sp. 1.

Solanum scandens, seu *dulcamara*. C. B. P. Woody
Nightshade. English. In hedges. Sp. 8.

Soldanella maritima minor. C. B. P. Seacole-wort,
or Sea Bindweed. English. On the sea-shore. *Con-
volvulus*. Sp. 29.

Sonchus asper laciniatus. C. B. P. Prickly Sowthistle.
English. On arable land.

Sonchus laevis laciniatus latifolius. C. B. P. Smooth
Sowthistle. English. With the former.

Sophia chirurgorum. Ger. Flixweed. English. On
arable land. *Sisymbrium*. Sp. 6.

Sorbus fativa. C. B. P. The true Service. Sp. 2.

Sorbus torminalis. Ger. The wild Service. English.
In hedges. *Cratægus*. Sp. 2.

Spinachia vulgaris, *capsula feminis aculeata*. Inst.
Spinach. Sp. 1.

Staphysagria. Matth. Staves-acre. *Delphinium*. Sp. 11.

Stœchas purpurea. C. B. P. *Stœchas*, French Laven-
der, or Stick-a-dore. Sp. 1.

Stœchas citrini tenuifolia Narbonensis. J. B. Goldy-
locks. - *Gnaphalium*. Sp. 1.

Stramonium fructu spinoso oblongo, *flore albo*. Inst.
R. H. Thorn-apple. English. On dunghills. *Datura*.
Sp. 1.

Symphytum consolida major foemina, *flore albo*, vel
pallide luteo. C. B. P. Comfrey. English. In unculti-
vated places. Sp. 1.

Tamariscus Narbonensis. Lob. Tamarisk. Sp. 1.

Tanacetum vulgare luteum. C. B. P. Tansey. Eng-
lish. In unfrequented lanes. Sp. 1.

Telephium vulgare. C. B. P. Orpine. English. In
woods, and moist land. *Sedum*. Sp. 14.

Thapsia Carotæ folio. C. B. P. Deadly Carrot. Sp. 3.

Thlaspi arvense, *filiolis latis*. C. B. P. Treacle Mus-
tard. English. In arable land, but rare. Sp. 2.

Thlaspi arvense, *vaccariæ incano folio*, *majus*. C. B. P.
Mithridate Mustard. English. In arable land, and
near hedges. Sp. 1.

Thuya Theophrasti. C. B. P. Tree of Life. Sp. 1.

Thymelæa foliis lini. C. B. P. Spurge-flax. *Daphne*.
Sp. 7.

Thymus vulgaris, *folio tenuiore*. C. B. P. Thyme.
Sp. 2.

Tithymalus latifolius, *Cataputia dictus*. H. L. Gar-
den Spurge. *Euphorbia*. Sp. 18.

Tithymalus palustris fruticosus. C. B. P. German
Spurge, or greater Efula. *Euphorbia*. Sp. 22.

Tithymalus foliis pini, *forte Dioscoridis Pityusa*.
C. B. P. The lesser Efula. *Euphorbia*. Sp. 27.

Tormentilla sylvestris. C. B. P. Tormentil. English.
On heaths. Sp. 1.

Tragacantha. C. B. P. Goat's-thorn. Sp. 1.

Trichomanes, five *Polytrichum officinarum*. C. B. P.
Maiden-hair. English. On walls, and the side of shady
banks. Sp. 1.

Trifolium pratense purpureum majus. C. B. P. Tre-
foil. English. In pastures. Sp. 1.

Trifolium arvense humile spicatum, five *Lagopus*.
C. B. P. Hare's-foot Trefoil. English. On arable land.
Sp. 9.

Trifolium palustre. C. B. P. Bog-bean, or Marsh
Trefoil. English. On bogs. *Menyanthes*.

Triticum hybernum, *aristis carens*. C. B. P. Wheat.
Sp. 1.

Tussilago vulgaris. C. B. P. Coltsfoot. English. On
barren land. Sp. 1.

Valeriana hortensis, *phu folio olufatri Dioscoridis*.
C. B. P. Valerian. Sp. 1.

Valeriana palustris minor. C. B. P. The lesser Vale-
rian. English. On moist meadows, and in woods.

Valeriana sylvestris major, *foliis angustioribus*. Rand.
Wild Valerian. English. On chalky closes. Sp. 2.

Verbascum mas latifolium luteum. C. B. P. Mullein.
English. On dry banks, and sandy land. Sp. 1.

Verbena communis, *cæruleo flore*. C. B. P. Vervain.
English. Near farm-yards. Sp. 1.

Veronica mas supina, & *vulgatissima*. C. B. P. Speed-
well, or Paul's Betony. English. In woody places. Sp. 1.

Veronica aquatica major, *folio subrotundo*. Mor. Hift.
Brooklime. English. In standing water. Sp. 16.

Vicia fativa vulgaris, *femine nigro*. C. B. P. Vetch,
or Tare. Sp. 5.

Vinca Pervinca vulgaris. Ger. Periwinkle. English.
In hedges and woods. *Vinca*. Sp. 1.

Viola martia purpurea, *flore simpliciorodoro*. C. B. P.
Violet. English. In woods, and near hedges. Sp. 1.

Viola tricolor hortensis repens. C. B. P. Heart's-ease,
or Pansies, common in the north of England. Sp. 10.

Virga aurea angustifolia minus ferrata. C. B. P. Gol-
den Rod. English. In woods, and near hedges. *Soli-
dago*. Sp. 1.

Vitex foliis angustioribus, *cannabis modo dispositis*.
C. B. P. The Chaste-tree. Sp. 1.

Vitis Idæa, *foliis oblongis crenatis*, *fructu nigricante*.
C. B. P. Bilberry. English. On moory heaths. *Vacci-
nium*. Sp. 1.

Vitis vinifera. C. B. P. The Vine. Sp. 1.

Ulmaria. Clus. Meadow-sweet, or Queen of the
Meadows. English. In moist meadows, and by the
side of ditches. *Spiræa*. Sp. 12.

Urtica urens maxima. C. B. P. Nettle. English. By
hedges and banks. Sp. 1.

Urtica urens, *pilulas ferens prima Dioscoridis*, *femi-
ne lini*. C. B. P. The Roman Nettle. Sp. 1.

Xanthium. Dod. The lesser Burdock. Sp. 1.

Zea briza dicta, vel *Monotoccos Germanica*. C. B. P.
Spelt, or St. Peter's Corn.

*A CATALOGUE of the large Trees which are admitted in the
London Dispensary, as medicinal Plants, but generally grow too large
to be admitted into small gardens:*

A BIES-mas, conis sursum spectantibus. C. B. P.
The Silver Fir. Sp. 1.
Abies tenuiore folio, fructu deorsum inflexo.
C. B. P. The common, or Spruce Fir, or Pitch-tree.
Sp. 2.

Amygdalus fativa. C. B. P. The Almond-tree. Sp. 1.
Armeniaca fructu majore. Inst. R. H. The Apricot.
Sp. 1.

Betula. C. B. P. The Birch-tree. English. In woods.
Sp. 1.

Castanea fativa. C. B. P. The Chestnut-tree. Sp. 1.

Cerasus major ac sylvestris, fructu subdulci, nigro co-
lore inficiente. C. B. P. The Black Cherry. English.
In hedge-rows, and some woods. Sp. 2.

Cerasus fativa rotunda, rubra & acida. C. B. P. The
Red Cherry. Sp. 1.

Cydonia fructu oblongo læviori. Inst. R. H. The
Quince-tree. Sp. 1.

Ficus communis. C. B. P. The Fig-tree. Sp. 1.

Fraxinus excelsior. C. B. P. The Ash-tree. English.
In hedge-rows. Sp. 1.

Fraxinus rotundiore folio. C. B. P. The Manna Ash.
Sp. 2.

Ilex aculeata cocciglandifera. C. B. P. The Kermes
Oak. Quercus. Sp. 18.

Larix folio deciduo, conifera. J. B. The Larch-tree.
Sp. 1.

Malus sylvestris, acido fructu albo. Inst. R. H. The
Crab-tree. English. In hedges. Sp. 1.

Malus fativa. Raii Syn. The Apple-tree. Sp. 2.

Morus fructu nigro. C. B. P. The Mulberry. Sp. 1.

Nux juglans, five regia vulgaris. C. B. P. The
Walnut. Juglans. Sp. 1.

Perfica molli carne, & vulgaris, viridis & alba. C. B.
P. The Peach-tree. Sp. 1.

Pinus fativa. C. B. P. The Pine-tree. Sp. 2.

Pinus sylvestris. C. B. P. The wild Pine, or Pinafter.
Sp. 1.

Populus nigra. C. B. P. The Black Poplar. English.
In hedge-rows. Sp. 3.

Pyrus fativa. C. B. P. The Pear-tree. Sp. 1.

Quercus latifolius fœmina. C. B. P. The Oak-tree.
English. In forests and woods. Sp. 1.

Salix vulgaris alba arborescens. C. B. P. The Willow.
English. By the side of rivers. Sp. 1.

Suber latifolium, perpetuo virens. C. B. P. The Cork-
tree. Quercus. Sp. 20.

Tilia fœmina, folio majore. C. B. P. The Lime-
tree. Sp. 1.

Ulmus campestris & Theophrasti. C. B. P. The
Elm-tree. English. In hedge-rows. Sp. 3.

F I N I S.

The READER is desired to correct the Mistakes, as also to add to the trivial Titles where they are wanting. The Figures after the generical Titles denote the Species.

A CANTHUS 2. lege (*Niger*)
 Acanthus 3. lege (*Dioscordis*)
 Acer 10. lege (*Creticum*)
 Acetosa 3. lege (*Scutata*)
 Acetosa 4. lege (*Digyna*)
 Adansonia, add (*Baobab*)
 Adenanthera, add (*Pavonica*)
 Adoxa, add (*Moschatellina*)
 Agave 2. lege (*Virginica*)
 Alchemilla 2. add (*Hybrida*)
 Aloe 8. lege (*Brevifolia*)
 Aloe 10. add (*Humilis*)
 Aloe 13. lege (*Linguiformis*)
 Amethystea, add (*Cerulea*)
 Amomum 1. add (*Zinziber*) and lege
ovata instead of *ovato*
 Amomum 2. add (*Zerumbet*)
 Amygdalus 3. lege (*Sativa*)
 Ananas 3. lege (*Glaber*)
 Anguria, add (*Citrullus*)
 Annona 2. lege (*Muricata*)
 Arctium 3. lege (*Tomentosum*)
 Arum 13. lege (*Betifolium*)
 Arum 15. lege (*Esculentum*)
 Asparagus 1. add (*Sativa*)
 Asperugo, add (*Procumbens*)
 Aster 17. lege (*Glaber*)
 Astragalus 2. lege (*Hamosa*)
 Atraphaxis 1. add (*Spinosa*)
 Atraphaxis 2. add (*Undulata*)
 Atriplex 1. add (*Hortensis*)
 Atriplex 2. add (*Halimus*)
 Atriplex 3. add (*Portulacoides*)
 Avena, add (*Sativa*)
 Aurantium 1. lege (*Acre*)
 Bacteria, add (*Calycanthus*)
 Bellonia, add (*Aspera*)
 Bloodwort, see Rumex
 Bombax 3. lege (*Villosum*)
 Cachrys 1. lege (*Trifida*)
 Cæsalpinia 2. lege (*Crista*)
 Cannabis, add (*Sativa*)
 Capparis 5. lege (*Racemosa*)
 Capparis 8. lege (*Laurifolia*)
 Capparis 10. lege (*Triflora*)
 Cassia 7. lege (*Bicapsularis*)
 Catebeæ, add (*Spinosa*)
 Cecropia, add (*Peltata*)
 Cerinthe 2. lege (*Glaber*)
 Chamærops, lege (*Humilis*)
 Cheiranthus 2. lege (*Integrifolius*)
 Cheiranthus 4. lege (*Angustifolius*)
 Cheiranthus 9. lege (*Glaber*)
 Cheiranthus 15. lege (*Sinuatulus*)
 Chionanthus, add (*Virginica*)
 Chironia 1. add (*Frutescens*)
 Chironia 2. add (*Baccifera*)
 Cissampelos, lege (*Pareira*)
 Cistus 3. lege (*Brevifolius*)
 Cleonia, add (*Lusitanica*)
 Cliffortia 1. lege (*Illicifolia*)
 Coix 2. lege (*Angulata*)
 Convolvulus 2. lege (*Serpens*)
 Convolvulus 11. lege (*Glaber*)
 Conyza 3. lege (*Candida*)
 Conyza 5. lege (*Tomentosa*)
 Conyza 6. lege (*Salicifolia*)
 Conyza 12. lege (*Trinervia*)
 Conyza 17. lege (*Odorata*)
 Corchorus 4. lege (*Tetragona*)
 Corchorus 5. lege (*Linearis*)
 Corchorus 6. lege (*Bifurcatus*)

Corchorus 8. lege (*Hirsutus*)
 Coreopsis 5. lege (*Radiata*)
 Cotyledon 2. lege (*Spinosa*)
 Cotyledon 6. lege (*Ramosissima*)
 Croton 7. lege (*Populifolium*)
 Croton 9. lege (*Althæifolium*)
 Croton 10. lege (*Salvifolium*)
 Cupressus 2. lege (*Horizontalis*)
 Cytisus 4. lege (*Sessilis*)
 Cytisus 5. lege (*Hirsutus*)
 Delphinium 2. lege (*Ajaxis*)
 Dianthus 9. lege (*Ferrugineus*)
 Digitalis 4. lege (*Grandiflora*)
 Diosma 1. lege (*Oppositifolia*)
 Ebenus, add (*Cretica*)
 Eleagnus 1. lege (*Spinosa*)
 Epigea, add (*Repens*)
 Erica 4. lege (*Ciliaris*)
 Eryngium 5. lege (*Pallefcens*)
 Euonymus 4. lege (*Pinnatus*)
 Ficus 2. lege (*Sycamorus*)
 Ficus 6. lege (*Maxima*)
 Galeopsis 5. lege (*Orientalis*)
 Gentiana 10. lege (*Perfoliata*)
 Gladiolus 5. lege (*Angustifolius*)
 Gramen 1. add (*Repens*)
 Gramen 2. add (*Perenne*)
 Gramen 3. add (*Bulbosa*)
 Grewia 2. lege (*Africana*)
 Grossularia 1. lege (*Reclinata*)
 Gundelia, lege (*Glabra*)
 Helianthemum 3. lege (*Pilosum*)
 Helianthus 2. lege (*Multiflorus*)
 Helianthus 4. lege (*Strumosus*)
 Helicteres 2. lege (*Brevior*)
 Hermannia 5. lege (*Trifoliata*)
 Hibiscus 8. lege (*Vitifolius*)
 Hibiscus 20. lege (*Africanus*)
 Horminum 1. lege (*Verbenaceum*)
 Horminum 2. lege (*Lyrata*)
 Hyacinthus 1. lege (*Nonscriptus*)
 Hyacinthus 3. lege (*Campanulatus*)
 Hyacinthus 5. lege (*Ametystinus*)
 Hypericum 4. add (*Canariense*)
 Hyssopus 3. lege (*Altissima*)
 Jatropha 2. lege (*Quinquelobata*)
 Jatropha 5. lege (*Vitifolia*)
 Jatropha 6. lege (*Aconitifolia*)
 Inula 7. lege (*Oculus*)
 Juncus 4. lege (*Conglomeratus*)
 Juniperus 2. lege (*Suecica*)
 Lantana 2. lege (*Inermis*)
 Lathyrus 4. lege (*Parifensis*)
 Lathyrus 7. lege (*Hirsutus*)
 Lathyrus 14. lege (*Magniflorus*)
 Lathyrus 19. lege (*Americanus*)
 Laurus 2. lege (*Undulata*)
 Laurus 8. lege (*Enervia*)
 Limon 2. lege (*Spinosus*)
 Limon 3. lege (*Racemosus*)
 Lotus 3. lege (*Glaber*)
 Lotus 5. lege (*Creticus*)
 Lupinus 4. lege (*Hirsutus*)
 Lupulus, lege (*Humilis*)
 Lychnis 3. lege (*Diacia*)
 Mamea, add (*Americana*)
 Martynia 3. lege (*Louisianica*)
 Medicago 3. lege (*Tornata*)
 Melastoma 1. lege (*Plantaginifolia*)
 Melastoma 9. lege (*Petiolata*)
 Melongena 2. lege (*Teres*)
 Menispermum 3. lege (*Carolinianum*)
 Mentha 10. lege (*Chalepensis*)

Mespilus 4. lege (*Cordifolia*)
 Mimosa 4. lege (*Aculeata*)
 Morus 2. lege (*Siciliana*)
 Muscari 1. lege (*Botryoides*)
 Muscari 2. lege (*Comosum*)
 Muscari 3. lege (*Racemosum*)
 Muscari 4. lege (*Monstrosum*)
 Muscari 5. lege (*Orchioides*)
 Ophrys 1. lege (*Nidus avis*)
 Ophrys 2. lege (*Cordata*)
 Orchis 8. lege (*Conopsea*)
 Origanum 12. lege (*Hybridum*)
 Ornithopus 2. lege (*Nodosus*)
 Orobus 8. lege (*Venetus*)
 Palma 5. lege (*Gracilis*)
 Panicum 4. lege (*Alopecuroideum*)
 Passiflora 6. lege (*Olivæformis*)
 Phlomis 10. lege (*Flavescens*)
 Phlox 5. lege (*Paniculata*)
 Physalis 9. dele c
 Piper 2. lege (*Pellucidum*)
 Piper 4. lege (*Humile*)
 Piper 6. lege (*Laurifolium*)
 Prenanthes 4. lege (*Amplexicaulis*)
 Prunella 7. lege (*Novæ Angliæ*)
 Psoralea 7. lege (*Humilis*)
 Raphanus 3. lege (*Orbicularis*)
 Raphanus 5. lege (*Chinenfis*)
 Rapunculus 5. lege (*Orbicularis*)
 Rhamnus 3. lege (*Longifolius*)
 Rhamnus 4. lege (*Africanus*)
 Rubus 4. lege (*Glaber*)
 Rubus 8. lege (*Saxatilis*)
 Rudbeckia 6. lege (*Digitata*)
 Rumex 2. lege (*Alpinus*)
 Rumex 11. lege (*Chalepensis*)
 Ruscus 5. lege (*Trifolius*)
 Ruta 5. lege (*Ciliata*)
 Salicornia 2. lege (*Perennis*)
 Salsola 3. lege (*Soda*)
 Sambucus 5. lege (*Humilis*)
 Saponaria 4. lege (*Hispanica*)
 Scabiosa 9. lege (*Virga pastoris*)
 Scabiosa 13. lege (*Ochroleuca*)
 Scabiosa 18. lege (*Incisa*)
 Scabiosa 19. lege (*Fimbriata*)
 Scrophularia 4. lege (*Betonicefolia*)
 Sesamum, lege Sesamum
 Sideroxylum 2. lege (*Oppositifolium*)
 Sisyrinchium 2. lege (*Angustifolium*)
 Sisyrinchium 3. lege (*Bulbosum*)
 Smilax 11. lege (*Humilis*)
 Solidago 15. lege (*Hirsutissima*)
 Solidago 11. lege (*Humilis*)
 Solidago 20. lege (*Carnosa*)
 Stachys 8. lege (*Palustris*)
 Stæchas 2. lege (*Pedunculata*)
 Stæchas 3. lege (*Dentata*)
 Taxus, lege (*Baccata*)
 Thymus 6. lege (*Glaber*)
 Toxicodendron 4. lege (*Pinnatifolium*)
 Toxicodendron 8. lege (*Arboreum*)
 Tragia 2. lege (*Involucrata*)
 Vaccinium 3. lege (*Pensilvanicum*)
 Vanilla 3. lege (*Axillaris*)
 Vitex 3. lege (*Indica*)
 Vitis 4. lege (*Laciniata*)
 Ulmus 2. lege (*Scaber*)
 Ulmus 3. lege (*Sativa*)
 Ulmus 4. lege (*Glaber*)
 Ulmus 5. lege (*Hollandica*)
 Uvularia 1. lege (*Amplexicaulis*)
 Zea 3. lege (*Vulgaris*)



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